# POPULAR Computing WEEKLY

**35p** 3-9 November 1983 Vol 2 No 44


## This Week



**★ STAR**
**Diamond Digger on Spectrum by Jim Proven**
**GAME ★**

## News Desk

# Texas pulls the plug on micros

TEXAS Instruments is to withdraw from the home computer market

Production of the TI99/4A computer will cease in November — development of new consumer electronics products has already been stopped and existing stocks of the 99/4A will be cleared by further reducing its £99 tag. As many as ?om units could be sold off before Christmas for as little as £50 each

News of the US company's decision coincided with release of TI's third-quarter results — including a further loss of $110.8m. Sales were down 4 percent to just under $1.01 bn

TI chairman Mark Shepherd and president Fred Bucy in a joint statement blamed disappointing third quarter sales of 99/4A home computer consoles and software

With this situation continuing into October it became apparent that fourth-quarter demand would not be sufficient to prevent large additional losses

In order to limit further financial drain on TI we have made the decision to withdraw from the consumer and home computer business"

In this country the 99/4A computer has never been a top-seller Its troubles began from the moment it was introduced in a form incompatible with the British tv system It was supplied together with an NTSC standard monitor

**Continued on page 5**

## Jupiter hits the dust

JUPITER Cantab maker of the Ace microcomputer, has gone into receivership

The decision to fold the company was apparently taken by Jupiter's directors Stephen Rout of solicitors Chater and Myhill acting for Jupiter said "We have been notified by the directors of the company to call a creditors meeting and to prepare a statement of affairs with a view to winding the company up"

Jupiter's directors have recommended that Chater's

**Continued on page 5**





**Continued on page 51**



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SUNSHINE

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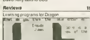
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## This Week







## Editorial

The demise of Jupiter Cantab, though not entirely unexpected, has still come as a blow to the micro industry.

Steve Vickers and Richard Altwasser the two co-founders of Jupiter Cantab played a large part in the development of the Spectrum. Steve wrote a large part of the Spectrum's Rom and manual while Richard designed much of the hardware.

However rather than remain inside Sinclair's comfortable cocoon they decided to try and emulate Sir Clive by setting up on their own.

Their first product the Jupiter Ace received a mixed reception. It had the advantage of being the first low-cost micro dedicated to running Forth but it only had 3K Ram and a black and white display.

In a market that is being increasingly dominated by a few large manufacturers there is far less scope for small companies than there was just two or three years ago. Even the larger companies such as Texas, Mattel and Atari have been suffering from the effects of the recent price-cutting war.

Nevertheless while the Jupiter Ace may not have captured the public's imagination in quite the same way as its ZX brethren it was a brave attempt. Both Vickers and Altwasser deserve our approbation for seeing an opportunity and trying to make it work.

There is an element of risk in any entrepreneurial operation — but it is better to try and fail than never to try at all and spend the rest of your life wondering what if?

The micro industry will be poorer without Vickers and Altwasser. Hopefully they will not be away too long.

## Next Thursday

**Jump over the gaps in the wall while avoiding the flying dragonflies but don't fall off the wall or you will lose points. Walk on the Wall — next week's star game for Commodore 64 by S Semlee.**

## Texas

Continued from page 1

priced at over £1 000.

In the US however the machine was extremely successful and a recent survey gave TI a 23 percent share of the under-$1 000 computer market.

However the 99/4A was an expensive computer to manufacture never being geared to low cost mass production. Vicious price cutting by its main US rival Commodore with the Vic20 and Commodore 64 machines, and the low cost entry of the TS1000 in the US and the Sinclair ZX81 and Spectrum in the UK forced the price of the 99/4A down to under £100. At this price it was suggested by some analysts Texas was actually losing money on each machine sold. The company was far too slow to replace the 99/4A and was forced to shelve at least two new products — the 99/2 and 99/8. Both became outdated before they were launched.

Now Texas intends to concentrate its activities on its semiconductor division on the business market with the TI Professional Computer and on the calculator market.

## Jupiter

Continued from page 1

senior partner John Cross be appointed liquidator.

Sales of the Jupiter Ace had never lived up to the expectations of the company's joint founders Steve Vickers and Richard Altwasser. One source suggested that the company's failure had in part resulted from management weaknesses.

The Ace launched in August 1982 was the first low cost computer to use the Forth



Steven Vickers

language rather than the more widely accepted Basic. However the Ace is both silent and black and white. As a result it was quickly overshadowed by the Spectrum.

As interest in Forth grew versions for most other micros became available as a software option and the Ace not being able to run Basic was limited by a lack of good software.

First signs of problems at Jupiter came in early June when Richard Altwasser left the company resigning his directorship. Steven Vickers then changed the direction of the company addressing the Ace not at the home market, but instead at schools where the machine offered a cheap Forth option.

Ironically the Spectrum which was the Ace's most damaging competitor was also designed by Steve Vickers and Richard Altwasser. The duo left Sinclair Research in April 1982 to set up Jupiter and design the Ace.

# Sinclair plans low-cost system

SINCLAIR plans a low cost development system to encourage software houses to write material for its new professional machine.

"It is our intention that there should be for our next computer, a relatively low-cost software development system available — priced around £1 000," said Sinclair's managing director Nigel Searle.

"Keeping the serious but small software house working on Sinclair products is very important to us. Something like a Vax system is clearly beyond the realms of some houses and developing software on the machine itself is no fun. So we have put out a contract to develop such a system for a reasonable sum of money."

The announcement is bound to increase speculation that the new professional computer — code-named the ZX83 — will not be based around the Z80 chip, possibly a 16-bit device. Nigel Searle: "We would use a processor other than the Z80 when we can get a good price — a 16-bit device might cost as much as £10.

"Certainly we have looked at them all. We spent a lot of time looking at the 16032 which Acorn has gone for but it is perhaps still a bit early. There is a danger of choosing a processor which does not become a standard and is not supported by the industry."

At the same time Nigel Searle reaffirmed Sinclair's commitment to the Spectrum machine emphasising that the ZX83 — expected to be launched in early 1984 — would not be a replacement for it.

"We have considered the options available to us but at the present there are no plans for any new low-cost machine.

"Obviously we would consider it much more keenly if Spectrum sales showed signs of dropping off or if we felt that a competitor was seriously on the verge of damaging our sales. But at the moment, I don't see anything on the horizon that might do that.

"Even so we could not replace the Spectrum except with something completely software compatible."

## Atari price problems

ATARI'S plan to convert its own games to run on other microcomputers, may be hit by its own pricing structure.

A new software division Atarisoft is developing material for the Vic20 Commodore 64 and TI99/4A on Rom cartridge which will be priced at £29.95. Titles for the Spectrum Dragon and BBC machines will go on cassette priced at £14.99.

Seven titles are planned — *Pacman, Centipede, Defender, Dig Dug, Donkey Kong, Robotron* and *Stargate*.

The Vic20 and 64 cartridge prices would appear to compare unfavourably with Commodore's own cartridges at £9.95 — a difference of £20. Similarly the Spectrum cassettes seem overpriced when compared with a more usual price of around £6.

Defending the pricing Atari UK's marketing manager Eric Salamon said: "These are the best selling games worldwide and at the end of the day you are paying for artistic input."

The first title will be *Pacman* for the Spectrum available in November this year. Other titles will follow with the full range across the six machines due to be complete by April 1984.

The Vic20 Commodore 64 and TI conversions are being carried out in the US while the cassette material for the Dragon Spectrum and BBC computers is being developed by sub-contactors working for Atari UK.

Spectrum versions are being produced by a new company formed for the purpose Software Converters.

## GSI expands to Frimley



*Sinclair's Camberley distributor GSI has moved to new enlarged premises in Frimley.*

*The expansion has been necessitated by the volume of goods being handled — GSI distribute to the high-street chains as well as operating Sinclair's mail order service. Ten percent of Spectrum's are now sold by mail-order.*

*When GSI first started processing postal orders for the ZX80 computer in 1980 it dealt with around 500 orders a week. At present GSI has over 20 000 Spectrums a week passing through its system.*

*GSI is now gearing up to deal with orders for the Sinclair flat-screen tv and, next year the new Sinclair professional computer. As with Sinclair's other products the new computer is expected to be offered first by mail-order.*

# 600XL goes on sale this week

THE new Atari 600XL computer goes on sale for the first time this week

Its introduction marks the first stage of the company's proposed recovery plan On it, and its more advanced relative the 800 XL, Atari is pinning its hopes of recouping some of the huge losses incurred by the company in the last nine months

The 600XL will be priced at £159 and replace the existing 400 machine The 800XL — the 800 replacement — which it is still hoped will be available in quantity by late November will sell for £249 The 600XL will be upgradable to the 800XL for the price difference of £90 The two new machines are completely software compatible with the existing 400 and 800 computers

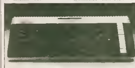
'Both machines will have all the features we have had with the 400 and 800, but at a price we can make money at it commented Atari UK's managing director Graham Clark


Graham Clark

"Everyone over here and in the US is stumbling through a period when margins are declining, and some will go down

'But Atari is here to stay and we are beginning to recover our position

In most of the major markets I think we will see good sales this Christmas Obviously it takes time to build back up a market share like Commodore or Sinclair but I think by Christmas 1984 we will have a very substantial piece of the UK market "



## Former Ed joins Acorn

FORMER *Daily Express* Editor Christopher Ward has joined Acorn He was appointed a non-executive director in June this year

His responsibilities include looking for marketing and communication opportunities

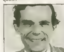
'A lot of people have expressed surprise at an ex-Fleet Street Editor going into the field of micros " he says, "but it is actually quite natural Micros and newspapers are both in the business of transmitting information and are moving closer together all the time

## 1000 Metalab applications

SINCLAIR Research is still sifting through over 1 000 applications for the few vacancies at its new £2m research and development centre at Milton Hall in Cambridge — Metalab

When the facility was first announced in June this year, Richard Cutting formerly of Cambridge Consultants was appointed to head it up He announced that Sinclair would be looking for a small number of top-flight researchers to work at Metalab investigating a wide range of topics from battery technology to robotics

About 12 people are expected to be chosen, although the final number will depend on the strength of the applications A spokesman for Sinclair Research said "Nearly all of the 1 000 applications have been of an extremely high quality


Richard Cutting

## AWA take-over

AWA Software has been taken over by MC Lothlorien

The three AWA programs *Orion* — an one assembler/disassembler — and *Beetlemania* and *Bedlam* — action games for the Spectrum — will now be marketed by Lothlorien

Also, Steve Hughes, AWA's programmer, will join Lothlorien on an exclusive contract to produce further arcade style titles

## Chess prize money

ACORN Computers is to provide over £40 000 in prize money for the World Chess Championships due to be held in Britain for the first time next month

The company the only one to sponsor the event will make an additional donation of over £20 000 to the competition organisers the World Chess Federation

A suitable arena for the contest — to be known now as the Acorn World Chess Championships — has not yet been found

## Commodore profits go up

COMMODORE International has again reported increased profits

Sales for the quarter to October 1 were up to $209m, more than doubling the $103m earned in the previous three months

The figures are in sharp contrast to those announced in recent months by many other big US computer companies — many of whom have reported heavy losses

## Interface for Model B

THE Pro link is a programmable joystick interface for the BBC model B

Manufactured by Aztec Software, the Pro link enables any Atari compatible joystick to be linked to the BBC via the user port Nine different functions can be programmed into the joystick such as fire, up, down, right and left

The Pro link package, which consists of an adaptor and a software cassette, costs £9 99 including VAT

Aztec is also about to release Centronics printer interfaces for both the BBC and the Commodore 64 A combined printer/joystick interface for the Acorn Electron will also be available by the end of November

Aztec Software which is based at 18 Gregory Springs Lane Mirfield, West Yorkshire WF14 8LE will be exhibiting their wares at the Northern Computer Fair Manchester on November 24-26

## New MD for Mattel

THE new managing director of Mattel Electronics UK after the departure of Mike Lunch earlier this month, is to be Ian Wilson, presently the acting managing director

The announcement comes amid increasing speculation that the struggling US parent may try to sell off a part of its toy division's stock to raise quickly needed funds Unlike the stricken electronics division, the toy company is enjoying a record year

It is also reported that at one point Mattel seriously considered closing down its electronics and computer division entirely before the end of this year This option now appears to have been ruled out because it could damage any sell off of toy division stock

## Schools fair

THE Educational Publisher's Council is organising a Schools Computer Fair aimed at teachers

The event is being held at the Regent Crest Hotel Carburton Street, London W1 Doors open at 9 30 am on both days closing at 8 pm and 7 pm respectively Entry is free



## Which joystick?

I have recently acquired a 48K Spectrum and I would now like to add a joystick for added enjoyment of the many games available. However, I am somewhat confused as there appear to be many different types of joystick on the market. I wonder whether you or any of your readers might advise me on the best choices for use with the Spectrum. Perhaps anyone answering this plea for help would also advise me of the pros and cons in respect of their recommendation.

*Stephen Paris*
*71 Farnham Road*
*Branksome*
*Poole*
*Dorset*
*BH12 1PW*

## Flight simulator

I have recently purchased a Vic20 home computer and as I am very keen on aircraft I have been trying to find a flight simulation for it. However, so far I have been unsuccessful and I would appreciate your help. Please could you tell me if there is currently one on the market and if not, whether there is one planned for the future.

*Kevin Smith*
*9 Castleton Court*
*Marlow*
*Bucks*
*SL7 3HW*

**Surprisingly enough, I am not aware of any flight simulation programs for the Vic20, though they seem to abound for other machines. If any of our readers know of such a program, hopefully they will write in and tell us.**

## Dragon disc drive

I have just read this week's issue of your magazine (20-26 October) and I was interested in the letter from J A Niblock of Nuneaton. There are one or two points that I would like to raise in connection with this, to save other readers with Dragon disc drives getting confused.

I agree with the first point concerning the use of separators, but the second point raised is rather misleading.

In the manual (preliminary version) it states that the end of a file can be detected by *Eof ( File )* which will have the value of *0* if the read pointer is at the end of the file or 1 otherwise. This is incorrect: the values should be reversed, ie, *Eof ( File ) = 1* if at the end or *0* otherwise.

There is a further problem here however. If you follow convention, and check for *Eof* before a *Read* command, you will get a value of *0* returned. This is because the system variable *Eof* is reset to *0* by the next Basic instruction. This means that *Eof* will only have the correct value of *1* at the end of the file, if the *Eof* function is used after the *Read* command. The way this is used would be

```
IF EOF ( FILE') 1 THEN do end
routine ELSE action
```

Another point worth noting is that it is not necessary to use the file specifiers for *Eof*, ie *Dat, Bas, Bak, Bin*.

With regard to point 5, J Niblock says that only 5 read and 5 write files may be open. This is 10 and not 5. When a file is written to for the first time (ie it is created) the file pointer will default to the beginning for *Fread* and *Flread* and to the end for *Fwrite*. Therefore you may have 10 files open; the controller does not discriminate between the two. I regularly use 9 data files simultaneously without trouble.

The patterning on the screen could be caused by a number of things. There is a certain amount of interference caused by any external (to the cpu) event, as can be seen when using *Sound* or *Cload* and *Csave*. This would seem to be a fault of the modulator. I have converted a colour tv and fitted a video input to it, and have no trouble. This problem is also quite apparent when using *Telewriter* and printing.

The power supply, although running warm, should be quite adequate for the controller. My machine gets left on with Tandy's *Edtasm+Assembler* cartridge in for days at a time and I never unplug the power supply, so the transformer is always warm. It is much more likely to get hot due to the fact that the cpu is doing a lot more work by loading and dumping data to disc.

When I bought my drive, the controller was faulty but this was quickly changed by my supplier, and the system is very robust and forgiving. I would suggest to J Niblock that he get his system checked out by his dealer.

*Martin Vernon*
*8 Trinity Square*
*Llandudno*
*Gwynedd*

## Issue 3 problems

The letter from Sinclair Research in *PCW* 13 October on the basis of practical evidence is untrue, and your footnote to the letter from J S Mellor is too complacent: there is a real problem with the parts on the Issue 3 computers.

I recently found it necessary to purchase a new Spectrum when my Issue 2 Spectrum went on the blink.

The new computer was an Issue 3 model. Contrary to the claim made in the Sinclair letter that D6 is set to zero when there is no signal coming from the tape recorder, I found that this bit, unlike Issue 2 computers, is highly unstable. The bit went from zero to one in an irregular fashion over a period of ten minutes when the computer was started from cold.

This was tested several times (without any tape connections made to the computer) with the same result.

In the hope that this instability was a one off, I have exchanged the computer twice and have found exactly the same problem.

In one of my more used programs I use port 254 as a computer port ... after all Issue 3 is a computer for input of information, and as this is done through the ear socket I use D6.

Issue 3 has a hardware problem, and Sinclair should face up to it. Good hardware practice demands that inputs and outputs from chip systems are firmly referenced to either of the supply rails — to demand, as Sinclair does, that the software should be tailored to accommodate their problem is to make the tail wag the dog.

*M Wales*
*74 Australia Grove*
*West Simonside*
*South Shields*
*Tyne & Wear*

## Manic Miner

Owners of a 48K ZX Spectrum who have purchased *Manic Miner* may be interested in the following. Load *Miner* in the normal way. When it loads press *Enter* then type in the number *6031769*.

If you typed it correctly a boot should appear bottom left of the screen. You now have access to the 20 caverns.

| Room | Code |
|---|---|
| 1 | 6 |
| 2 | 61 |
| 3 | 62 |
| 4 | 621 |
| 5 | 63 |
| 6 | 136 |
| 7 | 632 |
| 8 | 6321 |
| 9 | 64 |
| 10 | 641 |
| 11 | 642 |
| 12 | 6421 |
| 13 | 643 |
| 14 | 6421 |
| 15 | 6432 |
| 16 | 12346 |
| 17 | 63 |
| 18 | 651 |
| 19 | 642 |
| 20 | 1266 |

Supposing you wanted to go to the final cavern. Simply press keys *6* and *5* and *2* and *1* all at the same time and then release them quickly.

*John Condutt*
*12 Beechnut Close*
*Wigston*
*Leicester*

## Manic Miner again

Here is a Poke which should come as a relief to any remaining sane people with a copy of Bug Byte's superb *Manic Miner*.

Yes, Willy is now unstoppable! The magic instruction is *Poke 35136,0* which should be inserted as line 25 in the short Basic program which loads prior to the title. For the technically minded, this replaces the *Dec (Hl)* instruction which subtracts one from the number of lives remaining, replacing it with a *Nop* instruction.

*Ian Beynon*
*33 The Chase*
*Romford*
*RM1 4BE*

# Diamond Digger

**A new game for 48K Spectrum by Jim Provan**

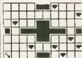
In this game the object is to move your spade around the different grids digging up diamonds. Occasionally an alien will drop down one of the columns. If you are hit, you lose one of your three lives.

You are represented by the spade which starts in the bottom corner of the grid. After each grid has been mined, you go on to the bonus stage. Your spade moves along the top of the screen until you press a key. Then it falls down the column it is above.

The object is to land it on the diamond. Bonus points are awarded depending on the colour of the diamond. Use the cursor keys for movement.

This game was written on a 48K Spectrum but it may run on the 16K machine. ■





```
   5 BORDER 0: PAPER 0: INK 7: C
LS
   7 GO SUB 5000
  10 RESTORE 20: FOR x=USR "a" T
O USR "i"+7: READ y: POKE x,y: N
EXT x
  20 DATA 0,0,0,31,31,24,24,24,2
4,24,24,31,31,0,0,0,0,0,248,24
8,24,24,24,24,24,24,248,248,0,0,
0
  30 DATA 24,24,24,31,31,24,24,2
4,24,24,24,248,248,24,24,24,2
4,24,255,255,0,0,0,0,0,255,255
,24,24,24,24,24,24,24,24,24,24,2
4,0,0,0,255,255,0,0,0
  40 DATA 24,24,24,255,255,24,24
,24,0,24,56,112,240,224,14,7,3,1
,0,0,0,0,0,128,192,192,128,128,
224,128,62
  50 DATA 0,0,63,127,255,255,255
,127,0,0,252,254,255,255,255,254
,63,31,15,7,3,1,0,0,255,240,240
,224,192,128,0,0
  60 DATA 0,63,121,249,255,112,6
0,0,0,252,158,159,255,14,60,0
 100 LET screen=1
 105 LET diff=0
 110 LET score=0
 120 LET lives=3
 130 LET d=0
 140 LET p=1
 150 LET tot=0
 162 LET yp=19: LET xp=1
 170 IF screen=6 THEN LET screen
=1: LET diff=diff+.05
 180 LET tune=1
 200 GO SUB 1000+screen
 205 PRINT #0;AT 1,0; INVERSE 1;
"SCORE"
 220 IF INKEY$="5" AND xp>1 AND
ATTR (yp,xp-3)<>7 THEN PRINT AT
yp,xp; PAPER p;"  ";AT yp+1,xp;"  "
: LET xp=xp-3: GO TO 250
 230 IF INKEY$="8" AND xp<28 AND
ATTR (yp,xp+3)<>7 THEN PRINT AT
yp,xp; PAPER p;"  ";AT yp+1,xp;"  "
: LET xp=xp+3: GO TO 280
 240 IF INKEY$="6" AND yp<19 AND
ATTR (yp+3,xp)<>7 THEN PRINT AT
yp,xp; PAPER p;"  ";AT yp+1,xp;"  "
: LET yp=yp+3: GO TO 280
 250 IF INKEY$="7" AND yp>1 AND
ATTR (yp-3,xp)<>7 THEN PRINT AT
yp,xp; PAPER p;"  ";AT yp+1,xp;"  "
: LET yp=yp-3
 260 IF ATTR (yp,xp)=6 THEN LET
score=score+100: LET tot=tot+1:
LET p=INT (RND*5)+1: GO TO 320
 270 LET p=INT (RND*5)+1
 300 PRINT AT yp,xp;"  ";AT yp+1
,xp;"  "
 305 BEEP .1,a(tune): LET tune=t
une+1: IF tune=37 THEN LET tune=
1
 310 IF RND>.9 THEN GO SUB 500
 320 PRINT #0;AT 1,7-LEN (STR$ s
core); INVERSE 1;score
 330 PRINT #0;AT 1,29;"  ";lives
 340 IF tot=d THEN GO TO 800
 350 GO TO 210
 500 LET pos=INT (RND*9)*3+1
 505 IF RND<.1 THEN LET pos=xp
 510 FOR h=1 TO 19 STEP 3
 515 LET paper=(ATTR (h,pos))/8-
1
 517 IF paper=-1 THEN LET pap
er=7
 520 PRINT INK 0; PAPER paper;AT
h,pos;"  "
 530 FOR n=1 TO 12: NEXT n: BEEP
.1,a(tune): LET tune=tune+1: IF
tune=37 THEN LET tune=1
 540 IF h=yp AND pos=xp THEN GO
TO 600
 550 IF paper<>1 THEN PRINT A
T h,pos; INK
 560 IF paper=  THEN PRINT AT
h,pos; INK 6;"  "
```



```
585 IF paper<>0 THEN PRINT AT h,
21; PAPER paper
590 NEXT h
570 RETURN
600 FOR x=10 TO 0 STEP -1: BEEP
.1,x: BEEP .1,x-1: BEEP .1,x-5:
NEXT x
610 LET lives=lives-1: IF lives
=0 THEN GO TO 700
620 GO TO 130
700 RESTORE 710: FOR x=1 TO 7:
READ a,b: BEEP a,b: NEXT x
710 DATA 1,0,1,5,.5,4,.5,2,.5,1
,5,4,2,2
720 IF INKEY$="" THEN GO TO 720
730 RUN
800 FOR n=1 TO 2: RESTORE 805:
FOR x=1 TO 7: READ a,b: BEEP a,b
: NEXT x: NEXT n
805 DATA .2,10,.4,10,.2,12,.4,1
2,.2,10,.4,8,.5,7
810 CLS : PRINT : PRINT : FOR x=
1 TO 10: PRINT "|  |  |  |  |  |  |": NEXT x
815 PRINT 00,AT 1,0;"[redacted]"; P
RINT 00,AT 1,7-LEN (STR$ score);
INVERSE 1;score
817 PRINT 00,AT 1,20;"  ";lives
820 LET p=INT (RND*9)*3+1
825 LET i=0
830 FOR n=1 TO 20 STEP 3
835 LET i=i+1: IF i>7 THEN LET i
=1
840 PRINT AT 20,p; INK 1;"  ";AT
21,p; INK 1;"  "
850 PRINT AT n,n;"  ";AT 1,n
: BEEP .1,n: PRINT AT 0,n
;AT 1,n;
870 IF INKEY$<>"" THEN GO TO 90
0
880 NEXT n
890 PRINT AT 0,20;"  ";AT 1,30;
: GO TO 830
900 FOR x=1 TO 20: PRINT AT x,1
n;AT x,n;"  ";AT x+1,n;"  ":
BEEP .1,x+10: NEXT x
910 IF n<>p THEN GO TO 600
920 LET score=score+1000*
930 PRINT AT 0,11;"[redacted]"; INV
ERSE 1;10000)
940 FOR x=1 TO 400: NEXT x
950 LET screen=screen+1: GO TO
130
1000 CLS : PRINT
1010 FOR x=1 TO 7: PRINT
NEXT x
1020 PRINT AT 21,0;
1030 FOR x=1 TO 15 STEP 3: FOR y=
1 TO 20 STEP 3: IF RND>.5 AND x
>10 AND y<>1 THEN PRINT AT x,y;
INK 6;"  ";AT x+1,y; INK 6;"  ":
LET d=d+1: NEXT y: NEXT x: GO
TO 1050
1040 LET i=INT (RND*5)+1: PRINT
AT x,y; PAPER i;"  ";AT x+1,y; P
APER i;"  ": NEXT y: NEXT x
1050 RETURN
2000 CLS : PRINT
2010 FOR x=1 TO 2: PRINT
2020 PRINT AT 6,0;
2030 FOR x=1 TO 3: PRINT
2040 PRINT AT 15,0;
2050 FOR x=1 TO 8: PRINT
NEXT
2060 PRINT AT 21,0;
2065 FOR x=7 TO 14: PRINT AT x,7
;"[redacted]": NEXT x
2070 FOR x=1 TO 4 STEP 3: FOR y=
1 TO 18 STEP 3: IF RND>.8 AND x<>
1 AND y<>19 THEN PRINT AT y,x;
INK 6;"  ";AT y+1,x; INK 6;"  ":
LET d=d+1: NEXT y: NEXT x: GO T
O 2090
2080 PRINT AT y,x; PAPER (INT (R
ND*5)+1);"  ";AT y+1,x;"  ": NE
XT y: NEXT x
2090 FOR x=7 TO 22 STEP 3: FOR y=
1 TO 4 STEP 3: IF RND>.5 THEN P
RINT AT y,x; INK 6;"  ";AT y+1,x
; INK 6;"  ": LET d=d+1: NEXT y:
NEXT x: GO TO 2110
2100 PRINT AT y,x; PAPER (INT (R
ND*5)+1);"  ";AT y+1,x;"  ": NE
XT y: NEXT x
2110 FOR x=7 TO 22 STEP 3: FOR y
=16 TO 19 STEP 3: IF RND>.5 THEN
PRINT AT y,x; INK 6;"  ";AT y+1
,x; INK 6;"  ": LET d=d+1: NEXT
y: NEXT x: GO TO 2130
2120 PRINT AT y,x; PAPER (INT (R
ND*5)+1);"  ";AT y+1,x;"  ": NEX
T y: NEXT x
2130 FOR x=20 TO 28 STEP 3: FOR
y=1 TO 19 STEP 3: IF RND>.5 AND
1 AND y<>19 THEN PRINT AT y,x;
INK 6;"  ";AT y+1,x; INK 6;"  ":
LET d=d+1: NEXT y: NEXT x: GO
TO 2150
2140 PRINT AT y,x; PAPER (INT (R
ND*5)+1);"  ";AT y+1,x;"  ": NEX
T y: NEXT x
2150 RETURN
3000 CLS : PRINT
3010 PRINT
3020 PRINT
3030 PRINT
3040 FOR x=1 TO 10 STEP 3: FOR y
=1 TO 7 STEP 3: IF RND>.5 THEN P
RINT AT y,x; INK 6;"  ";AT y+1,x
;"  ": LET d=d+1: NEXT y: NEXT x
: GO TO 3070
3050 LET p=INT (RND*5)+1: PRINT
AT y,x; PAPER p;"  ";AT y+1,x;
: NEXT y: NEXT x: GO TO 3070
3072 FOR x=1 TO 10 STEP 3: FOR y
=13 TO 19 STEP 3: IF RND>.5 AND
y<>19 AND x<>1 THEN PRINT AT y,x
; INK 6;"  ";AT y+1,x;"  ": LET
d=d+1: NEXT y: NEXT x: GO TO 308
0
3080 LET p=INT (RND*5)+1: PRINT
AT y,x; PAPER p;"  ";AT y+1,x;
: NEXT y: NEXT x: GO TO 3090
3090 FOR x=19 TO 28 STEP 3: FOR
y=13 TO 19 STEP 3: IF RND>.8 THEN
PRINT AT y,x; INK 6;"  ";AT y+
1,x: LET d=d+1: NEXT y: NEXT
x: GO TO 3110
3100 LET p=INT (RND*6)+1: PRINT
AT y,x; PAPER p;"  ";AT y+1,x;
: NEXT y: NEXT x: GO TO 3110
3110 FOR x=19 TO 28 STEP 3: FOR
y=1 TO 7 STEP 3: IF RND>.8 THEN
PRINT AT y,x; INK 6;"  ";AT y+1
,x: LET d=d+1: NEXT y: NEXT
x: GO TO 3130
3120 LET p=INT (RND*8)+1: PRINT
AT y,x; PAPER p;"  ";AT y+1,x;
: NEXT y: NEXT x: GO TO 3130
3130 PRINT AT 10,4; PAPER INT (R
ND*8)+1;"  ";AT 11,4;"  ";AT 4,1
3; PAPER INT (RND*5)+1;"  ";AT 5
,13;"  ";AT 4,18; PAPER INT (RND
*5)+1;"  ";AT 5,18;"  "
3140 PRINT AT 16,25; PAPER INT (
RND*5)+1;"  ";AT 17,13;"  ";AT 1
6,15; PAPER INT (RND*5)+1;"  ";A
T 17,15;"  ";AT 10,25; PAPER INT
(RND*5)+1;"  ";AT 11,25;"  "
3150 RETURN
4000 CLS : PRINT
4010 FOR x=1 TO 4 STEP 3: PRINT
NEXT
4020 PRINT AT 5,0;
4030 FOR x=7 TO 13 STEP 3: PRINT
NEXT x
4040 PRINT AT 15,0;
4050 FOR x=1 TO 4 STEP 3: PRINT
4060 PRINT AT 21,0;
4070 LET xp=10: LET yp=10
4080 FOR x=10 TO 19 STEP 3: FOR
y=1 TO 19 STEP 3: IF RND>.8 AND
x<>10 AND y<>19 THEN PRINT AT y,
x; INK 6;"  ";AT y+1,x;"  ": LET
d=d+1: NEXT y: NEXT x: GO TO 41
10
4100 PRINT AT y,x; PAPER INT (RN
D*5)+1;"  ";AT y+1,x;"  ": NEXT
y: NEXT x
4110 FOR x=1 TO 7 STEP 3: FOR y=
1 TO 10 STEP 3: IF RND>.8 THEN P
RINT AT y,x; INK 6;"  ";AT y+1,x
;"  ": LET d=d+1: NEXT y: NEXT x
: GO TO 4130
4120 PRINT AT y,x; PAPER INT (RN
D*5)+1;"  ";AT y+1,x;"  ": NEXT
y: NEXT x
4130 FOR x=22 TO 28 STEP 3: FOR
y=7 TO 13 STEP 3: IF RND>.8 THEN
PRINT AT y,x; INK 6;"  ";AT y+1
,x;"  ": LET d=d+1: NEXT y: NEXT
x: GO TO 4150
4140 PRINT AT y,x; PAPER INT (RN
D*5)+1;"  ";AT y+1,x;"  ": NEXT
y: NEXT x
4150 RETURN
9000 DIM a(38): RESTORE 9010: FO
R x=1 TO 36: READ a(x): BEEP .2
,a(x): NEXT x
9010 DATA 0,0,4,4,5,5,7,7,0,0,4,
4,2,2,-5,-5,0,0,4,4,5,5,7,7,2,4
,2,4,2,-5,2,5,2,4,2,4,2,0
9020 RETURN
```

# Off the record

***David Kelly** talks to Jack Florey and Ashley Gray from CBS*

Much has been said recently about the way the home computer industry has grown up

By far the biggest upheaval has been in software selling The games have moved out of the mail-order coupons and PO Box numbers into the stores and high street retail chains

It has not been an easy transition In many cases the additional responsibilities have not fitted easily into the company s plans and a number of service companies are now offering distribution arrangements helping to take the load off the software houses

Some are new companies like Prism Others are established distributors in other areas who have moved to include video games They come mainly from the book publishing business like Websters or from the record industry like CBS or K Tel

CBS particularly have made a name for themselves because they have adopted a policy of signing up companies like Quicksilva and Bug Byte

CBS first began to look at the computer market in February this year after they detected a big growth in the number of cassettes being used for computer software

Jack Florey CBS s commercial director explains the decision People now have more leisure sadly partly to do with unemployment and, as a result, the whole leisure market is growing enormously — which means records videos and now a part of it is computer games That is why we decided to go into it

At the moment games form only a small part of what we do but software is going into the record shops the retailers are moving in and we must follow

So in the early part of this year Ashley Gray was brought in by CBS to look more closely at the market An accountant and chartered secretary his interest was in "the commercial side of corporate life and particularly business development

He says 'We began to look at computer software seriously when some duplication houses started pushing work our way work which was for them overload that they couldn t handle

CBS made the decision to enter the market as manufacturer and distributor 'Considering we were very late in the market we have moved a long way in a short time says Ashley ' The philosophy was always that we could go in on the back of our existing involvement in these areas for the music industry, using the quality image of CBS

CBS offered something that the software houses needed a company which would take away the hassle of the manufacture and distribution whilst at the same time leaving the decision making — which title how to advertise and so on — still with the software house

And to prove the point CBS has now in its roster of independent software companies Quicksilva Bug-Byte Virgin Games and Rabbit

Ashley explains the reason behind the choice There will be a big shake out in February or March next year, and a lot of the smaller software houses will disappear Perhaps even they are producing first class games but they will get left behind not because they are doing anything wrong but because other people are moving ahead so fast now

What we tried to do was to identify those in the market who knew what they were doing and who were likely to succeed in the future

That is not to say that Ashley reckons that after the big shake-out there will be smaller companies with good material who will be left high and dry Instead, he reckons these companies will form a kind of second tier They will concentrate more and more on the creative business of games writing and programming Wherever that creativity pops up it will be taken to one of the companies which does have the resources to take it to the market

"That great game will always get there somehow — it is like the author who hawks his book round all the publishers, and the last one sees something in it and it becomes a million seller

Ashley is convinced that the software industry will become more like the music business ' It s a hits industry At the moment there are so many companies that games are considered company by company When there are fewer companies that will change — things will begin to focus on individual authors And charts will come At the moment they are a mess but one chart will emerge as *the* one

"We are still going through the boom phase and the market is very volatile



Ashley Gray



*Jack Florey*

Somebody could still just enter the market and become the number one, building the whole company on one top title Just like Virgin did in the record industry with Mike Oldfield s *Tubular Bells* '

He believes that the market will mature to become marketing driven rather than product driven That will be what counts You have got to make the buyers want the product — you ve got to catch their imagination

'K-Tel are getting in They are bound to go on tv and just put the games up on screen it is an ideal medium because it is definitely the quality of the on-screen graphics that will sell a game

In his view the software market is ideal for CBS 'In a hit business the most important thing is to be able to get the product to the market Demand for a particular game can develop over a weekend and drop off just as fast Our job is to make sure that the companies we deal with make the most of each of their titles

' Our experience is in the record business which is very similar

CBS offers the software house cassette manufacturing, packing and distribution to the shops For that CBS makes a charge on a per unit basis

Jack Florey again We are just going to a label and saying 'Use our warehouse as your own We want the software house to keep its identity choosing what to release It's like a partnership arrangement

"The label is free to concentrate on what it is best at — building up a repertoire and marketing in their own style After all they know their own business better than we do

CBS s manufacturing is centred at Aylesbury feeding to a central warehouse in Shepherds Bush London From there the tapes are dispatched all over the country by Courier Express

Eventually CBS hopes to build up a roster of six or seven independent software labels ' We want to end up says Ashley Gray, ' with the same share of the video games market as we already have in the video and record industries — about 40-45 percent

Ashley is not, however, looking for additions to the first four until the New Year 'The whole thing is building up to an enormous pre-Christmas crescendo and at the moment we are concentrating on looking after the people we ve got ■

# VALH

48K SPECTRUM



# Questions and answers

***Keith and Steven Brain*** *take an educated look at learning programs for the Dragon*

Dragon Data promoted the Dragon as the family computer

The implication being that a Dragon would help you to learn more than just how to improve your reactions and zap the aliens more rapidly

A number of companies are now offering educational programs of one sort or another for the machine and as many of these are not easy to find in the high street, and it is always a bit of a gamble buying unseen by mail-order here is a review of many of the current offerings

*Infant Pack* from Shards contains two programs for the very young *Bottles* teaches and tests counting to the relentless accompaniment of the tune *Ten Green Bottles Alphabet* is designed to teach the alphabet and, although it has some nice ideas it falls down rather on the education side Letters are displayed on a small tv' in the centre of the screen with a corresponding word and small picture at the top Unfortunately many of the letters are drawn in a strange way which is likely to confuse rather than help small children

*First Letters and Words* is a new program from Abacus which is a first-class demonstration of how to *really* use the educational possibilities of a computer It is designed to teach young children how to form lower-case letters and words which it constructs on the hi-res screen exactly as you would write them on paper at a speed controlled by the user The first option forms the lower-case letter corresponding to a single key press An important feature is that where a downstroke overwrites an upstroke this is indicated by a change in the colour, which mirrors the action of your pen As the speed of formation can be altered the running of the program can be easily adjusted so that the child can copy the letter on paper at the same time

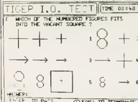
The second option immediately produces the letter for the key pressed but also gives an example of a word beginning with this letter Option three displays the entire alphabet, option four produces random words and option five shows random Christian names The final option allows you to write text on to the screen and then replay it

Without doubt this program is one of the more impressive educational programs we have seen and we would thoroughly recommend it to anyone with children at this stage The author Dr M E Newton has really got to gripe with a difficult problem

*Baby Dragon 1* from Gravesend Home Computers contains two programs for very small children entitled *Koko* and *Teddy*

*Koko* is a simple maths-test program which checks simple addition subtraction, multiplication or division at one of three skill levels and it is very well dressed up for small children as a game in which Koko the clown will be dunked in the water if you score 100 per cent Although only low-res graphics are used this is combined with interesting sounds and a lot of humour to make an attractive package

*Teddy* shows very well how a simple idea can be made interesting so that youngsters can learn as they play It is essentially a test of counting but the plot involves saving pots of honey from a line of sleeping bears which are liable to wake up at any moment and eat it As you might expect this is accompanied by a rendering of *Teddy Bears Picnic*




*Junior Pack* again by Shards has two good programs which are games *Tables* not surprisingly tests your knowledge of multiplication tables in a game where you try to guide a cursor to safety It is intended to help a child to learn his or her tables without realising it

*Jumbler* is a word recognition game where you have to fill in missing letters to complete a sentence This is quite good fun but rather frustrating as your answer must be exactly right and not just possible The number of available words is limited so some very strange sentences appear For example "The poor man walks to the wooden tent" ! Your success seems more likely to be due to ESP or lateral thinking than to actual knowledge

*Tables Tutor* from Micro De Bug is also designed to teach tables Although it has a number of options it is not particularly well conceived or executed It appears that Micro De-Bug are also testing out Dr Goebbels theories on propaganda as every single line printed has their logo (MDB#) at the start — thus wasting 16 percent of the screen space!

*Maths Tutor* from Abacus contains *Primary Addition Junior Maths* and a *General Test Routine* The first is a very simple routine which only involves counting spots on dice and entering the number If your answer is incorrect the right answer is shown but no attempt is made to show how the answer was obtained *Junior Maths* is better as it has 10 skill levels gives a more detailed breakdown of your performance and tests addition subtraction multiplication and division

The third choice *General Test Routine* allows the teacher (or parent) to set up a test file on tape containing particular questions and answers In this case of course, the teacher rather than the computer is always right! After the test has been carried out a record file can be created and later replayed to prove to disbelievers how you got on

*Spelling Tutor* is another program from Micro De Bug this time teaching spelling The program loads words from an Ascii file on the tape and the format of the test shows several words displayed together of which one is incorrectly spelt and must be corrected Once again the ubiquitous logo is much in evidence

## Test your knowledge of animals

*Music Tutor* from Abacus was designed to aid anyone learning a musical instrument Abacus claim that by using it you can 'learn to write and play music instantly' It offers a wide range of facilities allowing you to create, play amend delete save and load tunes Music can either be written in more or less normal Dragon *Play* format or in what Abacus calls template mode Here the notes and the possible length octave and volume options are specified in table-form It seems strange however that no reference is made in the program to conventional notation — minims, crotchets, etc

The instruction leaflet explaining the facilities is rather brief and it therefore took some time for us to sort out how to use the program Tunes can be saved in Ascii format and four demonstration tunes are supplied with the tape It is possible to specify a *MusicPrint* mode where the notes are displayed on a stave in hi-res graphics

The four colour *PMode 3* is used rather than the highest resolution *PMode 4* so definition is a little fuzzy and we also feel that it would have been more logical to have drawn each note as it was played

*Live and Learn* by Shards contains six programs *Graphics* is a step-by step tutorial on the hi res graphics but it falls down

rather as all the words appear separately on the text screen

*Music* is a similar attempt to explain sound on the Dragon which suffers from the same problem and also contains a simple *Organ* program. *Zoo* is a simple database program containing facts and figures about some animals which you can display or test your knowledge of. A world map is included which shows where the animals live in the wild.

*Survive* is based on a survival exercise in which you have crashed in the desert and must decide which of the objects at your disposal are of greatest value to you. This is really just an interesting game as the chances of you needing this information seem rather remote (don't write and tell us that you happen to live in Timbuctu). *Britain* produces a good map of Britain and then displays the location of a number of towns and 'citys' (sic) together with some information about them.

This is an interesting idea but we are a little worried about the accuracy of the information. For example, we hardly think Reading is in the East Midlands, we are not sure what an Ango-Saxon was, and the information about some of the towns seems to be rather out of date.

The text is displayed one character at a time and is accompanied by an irritating beeping noise which is sure to make you turn the sound off! *Map* uses the same map of Britain to test your geography. You are asked the location of a town and then you are shown the map with a number of possible points marked on it. A flashing cursor must then be moved to the correct point.

This is quite a nice idea but it is a pity that the authors of the program forgot to arrange for the cursor to put back anything it passed over. With so many programs on the tape it takes a long time to load the ones near the end. Also, sad to say, we do not rate the educational value of this selection very highly.

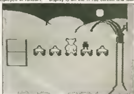
*Tell the Time in French, English and German* from Abacus first loads a general routine in which you choose in which language you wish to learn the time, and then loads the appropriate language program. A nice display of a clock-face is produced but, once again, you must jump back to the text screen to enter your answer.

There is quite a long delay before each new time is displayed as the program redraws the clock face from scratch each time instead of just erasing the old positions of the hands. The program is very particular about how you write the time — for example, you must always use '5 TO 9' rather than 'FIVE TO NINE' or '8 55'.

In the foreign-language versions some explanations of how to write the time are given, but you are advised to write these down on paper which rather seems to defeat one of the objects of using a computer. Surely it would have been better to have designated a *Help* key to call up the list if you get stuck. Although he may be good at telling the time perhaps the author needs some 'practice' (sic) at spelling.

*O Level Geography Weather Map Symbols* (again Abacus) is a higher level program designed for use in school or for home revision. You can choose to learn or test yourself on four groups of weather-map symbols (cloud, weather, wind and front) and within each group there is a further choice.

The graphic display of the map symbols is very clear but we must criticise the fact that this program does not put any text on to the hi-res display. In test mode, symbols from one group are displayed at random and your final score reported as a percentage of correct responses. This represents pretty basic use of the computer.



*Measuring Instruments* also confirms that Abacus newer programs are marked improvements on their old ones. The first option tests your skill at reading the distance between two arrows pointing to graduations on a ruler. The lowest level always starts from 0, but life is more difficult at the higher levels. If you are wrong then you are asked to read each point separately, and then calculate the difference.

At Level 7 we had great difficulty reading to two decimal points (which we suppose is what they were trying to prove!) and were glad that the computer eventually gave up in disgust and gave us the values to subtract. The second option deals with the vernier calliper, and the third the micrometer screw-gauge, the principles of which are both first explained. The graphic display of the calliper and micrometer are superb and they include close-up views of the actual scale.

## Not to be taken seriously

*Tiger Grand Prix*, by Tiger no less, is described as an educational game which makes learning fun. It consists of a main program and a series of 13 data files, and it comes with a small instruction manual.

The game consists of a race where your progress depends on the accuracy of your answers. Questions are picked according to the throw of screen dice, and the gremlins are waiting to catch you if you make a mistake. What happens if the gremlins catch you is supposed to be a secret, so we won't spoil it by telling you.

The data files provided are arranged in four stages for different age groups (from 7-10 to 16+) and the questions are very varied. Tiger are preparing a program which will allow you to construct your own data files to use with this game, which will greatly improve its value to the user. (Tiger even suggest you might put driving test questions on to the Grand Prix program which seems quite apt!)

This is a carefully thought-out idea which has been properly produced and the program should have a long and useful life.

*Tiger IQ Test*, again from Tiger, is something rather different. It tries to assess your IQ, but it is rather amusing to read the "Government Health Warning" in the instruction manual which advises you not to take the results *too* seriously. All the display is on the hi-res screen and looks impressive.

The tests look at general intelligence using numerical, literal and visual problems and there is a 30-minute time limit. Full instructions are given on-screen. Before the test proper there is a demonstration to show you what to expect. The final assessment reports are interesting, but at first we did not do so well. We were a little upset to be advised that we might be able to "learn some useful tasks under supervision, be able to attend to some personal wants and avoid dangers, and should live in an institution".

*Teach-type*, from DICOsoft/Gravesend Home Computers, is a specialised program to teach touch typing. Two versions are provided (one using the high-speed *Poke* to speed things up). The program starts by even explaining how you should sit and then the screen display shows a pair of hands and an exercise which you must follow.

The exercises start with one finger and slowly build up to more complex situations. It is quite easy to avoid the usual problem of cheating, by dropping your eyes to the keyboard, as each letter you press instantly appears on the screen immediately below the current point in the exercise. If you make a mistake, that letter is inverted and your speed and accuracy are continuously shown as both histograms and numbers so you can see how you are progressing.

From the start actual words are used for the exercises, which is more interesting than other 'gobbledegook' typing practise routines, and you progress to short

phrases based on the 150 most frequently-used English words

One of us has typed with four fingers for the past 20 years in spite of several well-intentioned attempts at learning to do it 'properly', but this is the first system he has tried which he felt he might actually manage to follow for more than a few hours!

The *Teletutor 1* package from Microdeal is a suite of four programs none of which are available separately As is so often the case with Microdeal these are conversions of American programs for the Tandy, but we are pleased to say that all transatlantic idiosyncracies have been carefully removed

The first program is *Spelling Test* which will either use a demonstration file or is designed to allow you to easily produce your own files This program scores over its rivals as it uses actual speech on a cassette sound track for the tests Instructions are available on screen and a volume check is included before you start The demonstration voice track features a very well spoken lady (obviously not an android) who pronounces a word and then puts it in context in a sentence You then type in your answer and the sequence is repeated until the test is complete

The second program on the first tape is *Word Drill* which gives a definition and a series of alternative options from which to choose It suffers from the problem of all tests of this type that the limited number of possibilities available in memory mean that several of the choices are nonsense (eg the capital of France is Bernard Shaw!) The length of time for each question can be adjusted

## Four first class programs

The second cassette contains two mathematical programs designed for the younger age group *Math Drill* is a test of addition subtraction multiplication and division, with the reward of producing a smiling face if you continue to answer correctly Up to six students can be tested at the same time, with up to 50 questions of different types and skill level

The program is unusual in that an up arrow indicates your position on the answer line and you are required to enter the answer in the order you would calculate it (eg for 50 + 50 you must type the 0 0 and then 1) This may seem unimportant in simple examples but is very significant when you get to level 10 (try dividing 36097 by 105 in your head) It also allows you to use remainders in division and calculate each part of a long multiplication separately

The second maths program is *Estimate* which tests mental arithmetic but is again unusual in that it keeps a record of how close you got to the correct answer

At first sight the package looks rather expensive, but the cost must be put in context by considering that it consists of four first class programs and an elaborate manual and that you can easily adapt it to suit whatever you want to test

Finally we will take a look at a couple of database programs as these can usefully be used to store and retrieve information by the more advanced student

*Profile* from Micro De Bug comprises a tape and a user manual which describes the structure of a computer filing system quite clearly and then gets down to explaining how to use it A nice feature is that it gives a picture showing what you should see on the screen at each point (besides the ever-present MDB of course!) It is a pity though that a demonstration file has not been included to experiment with

The maximum number of records is 100 (although you can start with a small file and enlarge it later) It is not necessary to specify the number at the start as you simply type **** at the start of a record to indicate the end of the file

The number of fields per record is rather limited as the maximum is four so it is difficult to even record name address and telephone number in normal format. The maximum number of characters in each field is 20 which is again rather small but a scale is provided as you enter characters so you can see if you are running out of space in the field Unfortunately, there is no indication of which field you are entering data to

You can edit an entry quite easily but to add more entries you must use the edit mode which is rather tiresome Files can be saved and loaded and you can *Find* a string provided that you specify the field to be searched The maximum size of the database is 8 000 characters and there are no sorting or printing facilities which further limits the value of this system

The *Filing System* from Progressive Software is a much more ambitious package which consists of four cassettes and a manual The system is suitable for the beginner as a *Lesson* tape is provided which uses a voice track and sample files to take you through all the stages involved in using databases

The system actually contains two different databases *Version One* is self-contained and free-format so that it is not necessary to specify field sizes, lengths and so on, in advance In *Version Two* the maximum number of fields per record is 22 and the maximum number of characters per field is 40 but maths functions can be incorporated to modify records the screen is mapped columns can be totalled an extra screen can be used, and searching and sorting is faster than in *Version One*

The records can be sorted in numerical or alphabetical order of a specified field Databases for *Version Two* must be first produced with the *Create* program but Progressive also provide the facility of converting a *Version One* database to *Version Two* A printout facility is provided and although it is not specified the maximum database size appears to be 13 000 characters

The manual is comprehensive and clear and although *The Filing System* is twice the price of *Profile* there is no doubt in our minds that it is a very professional (not to say progressive) product which fulfils the majority of standard database functions and is well worth the money

It is interesting to see that Progressive actually give a listing and explain their program instead of trying to protect it! This is obviously useful to anyone who wants to learn or modify the program for a disc system Our only small gripe is that the quality of the sound track is not as good as that on *Teletutor*

| Firm | Program | Price |
|---|---|---|
| Abacus Software UK Ltd | *Maths Tutor* | £5 00 |
| 21 Union Street | *Music Tutor* | £9 95 |
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# Tables and equations

*D H Cox presents two programs for trigonometric tables and quadratic equations*

If you find Trig tables boring, here is a short program to bring them to life

Our old friends sine, cosine and tangent are shown in graphical form and the correct values given below. Watch out for the user defined graphic symbols A, B, C in lines 200, 210, 220, 290 and 320. These turn into sin, cos and tan once the program has been run

You can input any angle in degrees or any of the inverse functions ASN, ACS, ATN to obtain the appropriate answers and picture

**Quadratic Equation**

This quick program will draw you a parabola from a quadratic equation of your own choice. Simply input values A, B and C and presto, there's your curve

The values of A, B and C may then be re-entered and further curves drawn which enables the different affect of these constants to be observed ■

```
 10 REM ************************
 20 REM *     Trigonometry     *
 30 REM *     by D.H.Cox       *
 40 REM ************************
 50 REM © 1983
 60 REM Set Centre
 70 LET X=128: LET Y=88: LET B=180/PI
 80 REM Define Graphics
 90 GO SUB 400
100 REM Draw Axes & Circle
110 PAPER 0: BORDER 0: INK 7: CLS
120 PLOT 0,Y: DRAW 255,0: PLOT X,0: DRAW 0,175
130 CIRCLE X,Y,70
140 INPUT FLASH 1;"Angle Deg ASN ACS ,ATN ",A$: LET A=VAL A$: IF CODE A$=181 OR CODE A$=182 OR CODE A$=183 THEN LET A=INT (A*B*100+.5)/100
150 REM Calculate SIN COS TAN
160 LET R=A/B
170 LET S=70*SIN R: LET C=70*COS R: IF C=0 THEN GO TO 180: LET T=70*TAN R
180 PLOT X,Y: DRAW C,S
190 PRINT AT 18,0;"Ang=";A: PAUSE 200
200 REM Graphics A=▒ B=▒ C=▒
210 DRAW -C,0: PRINT AT 10-INT S/8,15; INK 4; BRIGHT 1;"A";AT 19,0;"Sin=";INT (.5+1e4*SIN R)/1e4: PAUSE 200
220 PLOT X+C,Y+S: DRAW 0,-S: PRINT AT 10,15+INT C/8; INK 5; BRIGHT 1;"B";AT 20,0;"Cos=";INT (.5+1e4*COS R)/1e4: PAUSE 200
230 PLOT 198,0: DRAW 0,175
240 REM Infinite Tan
250 IF C=0 THEN GO TO 350
260 REM Draw Tan
270 LET T=70*TAN R
280 PLOT X,Y: IF ABS T>87 THEN GO TO 310
290 DRAW 70,T: PRINT AT 10-INT (T/8),25; INK 6;"C": GO TO 330
300 REM Tangent off screen
310 DRAW 6090/ABS T,87*SGN T
320 PRINT AT (21 AND T<0),25;"C"
330 PRINT AT 21,0; INK 5;"Tan=";INT (.5+1e4*TAN R)/1e4
340 PAUSE 0: CLS : GO TO 120
350 PRINT AT 21,0;"Tangent Infinite": PAUSE 0: CLS : GO TO 120
400 REM UDG A,B,C
410 DATA 0,0,BIN 11000000,BIN 10000000,BIN 11010111,BIN 01010101,BIN 11010101,0
420 DATA 0,0,BIN 11000011,BIN 10000010,BIN 10111011,BIN 10101001,BIN 11111011,0
430 DATA 0,120,BIN 11100000,128,BIN 10111111,BIN 10101101,BIN 10111101,0
440 FOR L=0 TO 16 STEP 8: FOR M=0 TO 7: READ N: POKE USR "A"+L+M,N: NEXT M: NEXT L
450 RETURN
```



```
Ang=30
Sin=0.5
Cos=0.866
Tan 0.5774
```

```
 10 REM QUADRATIC by D.H.COX ©
 20 PRINT "QUADRATIC EQUN    y=A*x↑2+B*x+C"
 30 REM Draw axes
 40 PLOT 0,75: DRAW 255,0
 50 PLOT 127,0: DRAW 0,153
 60 REM Scale Axes
 70 PRINT AT 11,2;"-10";AT 11,27;"+10"
 80 PRINT AT 12,3;".";AT 12,28
 90 PRINT AT 3,15;"+100";AT 21,15;"-100"
100 REM Input Constants
120 INPUT "A= ",A
130 PRINT AT 1,19;A
140 INPUT "B= ",B
150 PRINT AT 1,25;B
160 INPUT "C= ",C
170 PRINT AT 1,29;C
200 REM Plot Curve
210 FOR x=-127 TO 127
220 LET y=A*x*x/100+B*x/10+C
230 LET p=x+127
240 LET q=y+75
250 IF q>0 AND q<150 THEN PLOT p,q
260 NEXT x
270 INPUT a$
280 PRINT AT 1,0;"
290 GO TO 100
```

QUADRATIC EQUN    y=A*↑2+B*+C



# Heads will roll

***C R McGinley** demonstrates how a machine code routine can stop headings scrolling off the screen*

The auto scroll on the Dragon can be a bit of a problem when using *List* type displays ie any headings scroll off as well. This machine code routine scrolls the screen but leaves the top two lines of the screen alone.

It works by loading locations $167-$169 with a *Jump* to the routine. These locations usually hold a return being the location that the print routine jumps to after inputing a character.

The assembly language listing with notes explains the routine. Some points of interest are:

(1) *PSHS A X Y* is needed to save the original condition of the registers to be used as the routine is reached by a *JMP* and not a *JSR* that does not save the registers.

(2) Location $88 holds the next address for screen output.

(3) If scroll is needed, location $88 has to be loaded with the start of the second to last line to stop printing on the bottom line and therefore auto scrolling.

(4) *PULS A X,Y PC* restores the registers used to their original state.

(5) No *RTS* is needed as the program counter is pulled off the stack with the registers. The basic loader and demo program loads the code and executes it. It then goes into a demo program. Pressing the ↑ key scrolls the screen, releasing it stops the scroll.

(6) *Clear* will still clear the whole screen.

(7) You can print to the top two lines using *Print @* or after a *Clear*.

(8) *Poke & H167 &H39* stops operation of routine. *Poke & H167 &H7E* starts it again.

Once executed this routine works automatically and does not need to be executed every time you print to the screen. ■

```
20 '***M/C ROUTINE****
30 CLEAR 200,32700:A=32701
40 DATA'8E,7F,C9,8F,01,68,86,7E,B7,01,67
,39,34,32,8E,00,88,8C,05,E0,25,17,8E,04,
40,10,8E,04,60,A6,A0,A7,80,10,8C,06,00,2
6,F6,8E,05,C0,0F,00,88,35,82,FINI
50 READ A$.IF A$="FINI'THEN 60 ELSE POKE
 A,VAL("&H"+A$)
55 A=A+1:GOTO 50
60 EXEC 32701
100 '****DEMO PROG*****
110 CLS:PRINT " address',"value "PRINT S
TRING$(32,"-")
120 FOR A=1 TO 65535:PRINT A,PEEK(A)
130 IF PEEK(341)=223 THEN NEXT A ELSE 13
0
```

```
7FBD 8E7FC9      30       LDX  #$7FC9       LOADS LOCATION
7FC0 8F0168      40       STX  #0168        #167-#169 WITH
7FC3 867E        50       LDA  #$7E         JUMP TO MY
7FC5 B70167      60       STA  #0167        ROUTINE
7FC8 39          70       RTS
7FC9 3432        80       PSHS A,X,Y        SAVES ORIGONAL CONDITION
                                            OF REGISTERS
7FCB 8E0088      90       LDX  $88          CHECKS FOR FULL
7FCE 8C05E0     100       CMPX #1504        SCREEN
7FD1 2517       110       BLO  @END         END IF SCREEN NOT FULL
7FD3 8E0440     120       LDX  #1088
7FD6 108E0460   130       LDY  #1120        SCROLLS THE SCREEN
7FDA A6A0       140 @LOOP  LDA ,Y+          EXCEPT FOR TOP TWO LINES
7FDC A780       150       STA  ,X+
7FDE 108C0600   160       CMPY #1536
7FE2 26F6       170       BNE  @LOOP
7FE4 8E05C0     180       LDX  #1472        LOADS PRINT POSITION
                                            PIONTER
7FE7 0F0086     190       STX  $88          WITH START OF 2nD TO LAST
                                            LINE
7FEA 3582       200 @END PULS A,X,Y,PC      RESTORES REGISTERS TO
                                            ORIGONAL CONDITION
                                            AND RETURNS
```

# Bubbling under

***Michael Batty** explains sorting procedures in the second of a three part series*

Last week we presented a program to draw perspective views of a house. The program transformed the original 3-dimensional object to a 2 dimensional screen image which, although useful for exploring the geometry of perspective, produced rather unrealistic pictures. Each plane of the object was plotted without eliminating lines which lay behind its visible surfaces and thus the effect of depth created by the perspective was confused.

Removing hidden lines is a major problem in computer graphics, but it is made considerably easier where such lines can be covered up by painting the object with blocks of colour. Here we will show such a technique which uses one of the classic sorting procedures of computer programming.

An effective way of hiding unwanted lines involves plotting each plane of the object so that those furthest from the viewpoint are plotted first. As each plane is plotted, it is coloured in, and thus the last plane plotted will be nearest the viewpoint and will hide all the detail which is behind it.

The technique is very effective on simple objects with few plane surfaces such as the house of last week, but it involves sorting the planes with respect to their distance from the viewpoint. Such a sorting procedure is referred to as a *depth sort* and involves sorting so that the furthest plane is ranked first, the nearest last.

Many sorting procedures exist, but perhaps the simplest and best known which works reasonably well on a small number of elements in a pile is known as a *bubblesort*. As the name suggests, elements are sorted so that the largest 'bubble' goes to the top, the next largest to the next place and so on.

The algorithm works by systematically exchanging pairs of elements which are out-of-order. When the pile is entered and two elements out-of-order encountered, these are exchanged. The search then moves back up the pile exchanging until the order is correct, and then re-enters the pile at the next lowest level to reorder those not dealt with so far. Details of one such sort are available in Roy Atherton's *Structured Programming with BBC Basic* (Ellis Horwood, 1983).

The average distances of each plane from the viewpoint are calculated, these are bubblesorted, and the object then plotted plane by plane according to the new order. Each plane is plotted in black and its edges outlined in white. As the planes are built up, those nearer which overlap ones behind will hide the frame of the object, eventually leaving just the surfaces visible from the viewpoint. The sequence of planes plotted for the wire frame house of last week is shown in the figure.

The form of the program is based on last week's except that *Procframe* is replaced by *Procsolid* which accomplishes depth sort using *Procdepth* and *Procsort*. Two filling procedures are used to fill 4 and 5 point planes respectively using the *Plot85* fill routine, and edging each plane in white.

When you run the program, start with a view distance of about 1000, a screen distance of 500, and after each plane is plotted press any key to continue. In this way the picture will build up and hidden lines will be overplotted as the sequence in the adjacent figure shows.

Explore various effects by altering the parameters of the viewpoint and systematically move around and over the house. We are now in a position to use this solid object as a building block for creating something more dramatic. The obvious thing to do with a house is to generate many of them to form streets.

Next week we will conclude by showing how to do this, creating some interesting and evocative scenes. ■



```
10 REM Graphical Sorting based on Depth
   Sort
20 REM (c)Michael Batty.October,1983
30 MODE1
40 DIM W(10,3),S(10,2),P%(7,5),NP%(7)
50 DIM V(7),VV(7),NV%(7),C%(7)
60 VDU19,0,2;0;19,1,4;0;19,2,0;0;
70 VDU28,0,5,39,0:VDU24,0;0;1279;830;
80 N%=10:M%=7:VDU29,640;400;
90 COLOUR 128:GCOL0,129
100 CLS:CLG:COLOUR 2
110 FOR I%=1 TO N%
120   READ W(I%,1),W(I%,2),W(I%,3)
130   NEXT I%
140 FOR I%=1 TO M%
150   READ NP%(I%):NEXT I%
160 FOR I%=1 TO M%
170   FOR J%=1 TO NP%(I%)
180     READ P%(I%,J%)
190     NEXT J%:NEXT I%
200 FOR I%=1 TO M%
210   READ C%(I%):NEXT I%
220 INPUT TAB(1,1)"DISTANCE FROM VIEW",
    RHO
230 INPUT TAB(1,2)"DISTANCE FROM SCREEN"
    ,DIS
240 INPUT TAB(1,3)"HORIZONTAL ANGLE",TH
250 INPUT TAB(1,4)"VERTICAL ANGLE",PH
260 TH=RAD(TH):PH=RAD(PH):PROCSETUP
270 REM Transforms and Plots Solid Obje
    cts
280 REM Removing Hidden Lines
290 FOR I%=1 TO N%
300   PROCTRANS(I%)
310   NEXT I%
320 PROCSOLID
330 AA=GET:CLS:CLG:GOTO 220
340 END
350 DEFPROCSETUP
360 S1=SIN(TH):C1=COS(TH)
370 S2=SIN(PH):C2=COS(PH)
380 XR=RHO*S2*C1:YR=RHO*S2*S1:ZR=RHO*C2
390 ENDPROC
400 DEFPROCTRANS(I%)
410 X=W(I%,1):Y=W(I%,2):Z=W(I%,3)
420 X1=-X*S1+Y*C1
430 Y1=-X*C1*C2-Y*S1*C2+Z*S2
440 Z1=-X*S2*C1-Y*S2*S1-Z*C2+RHO
450 D=DIS/Z1:S(I%,1)=D*X1:S(I%,2)=D*Y1
460 ENDPROC
470 REM Sorts Object Planes by Depth from
480 REM Viewpoint using a Bubblesort Algo
    rithm
490 DEFPROCSOLID
500 PROCDEPTH:PROCSORT
510 FOR I%=1 TO M%
520   IF C%(NV%(I%))=1 THEN PROCFILL1(NV%
      (I%))
530   IF C%(NV%(I%))=0 THEN PROCFILL2(NV%
      (I%))
540   AA=GET
550   NEXT I%
560 ENDPROC
570 DEFPROCDEPTH
580 FOR I%=1 TO M%
590   V(I%)=-EXP(50):VV(I%)=EXP(50)
600   NV%(I%)=I%
610   FOR J%=1 TO NP%(I%)
620     K%=P%(I%,J%)
630     D1=(W(K%,1)-XR)^2:D2=(W(K%,2)-
        YR)^2
640     D3=(W(K%,3)-ZR)^2:D=SQR(D1+D2+D3)
650     IF D>=V(I%) THEN V(I%)=D
660     IF D<=VV(I%) THEN VV(I%)=D
670     NEXT J%:NEXT I%
680 FOR I%=1 TO M%
690   V(I%)=(V(I%)+VV(I%))/2
700   NEXT I%
710 ENDPROC
720 DEFPROCSORT
730 FOR I%=2 TO M%
740   FOR J%=I% TO 2 STEP -1
750     IF V(J%) =V(J%-1) THEN GOTO 800
760     T=V(J%):F%=NV%(J%)
770     V(J%)=V(J%-1):NV%(J%)=NV%(J%-1)
780     V(J%-1)=T:NV%(J%-1)=F%
790     NEXT J%
800   NEXT I%
810 ENDPROC
820 REM Plots and Fills Object Planes
830 DEFPROCFILL1(I%)
840 GCOL0,2
850 PROCMMOVE(I%,1):PROCMMOVE(I%,2)
860 PROCMPLOT(I%,3):PROCMMOVE(I%,1)
870 PROCMPLOT(I%,4).PROCLINE(I%)
880 ENDPROC
890 DEFPROCFILL2(I%
900 GCOL0,2
910 PROCMMOVE(I%,1):PROCMMOVE(I%,2)
920 PROCMPLOT(I%,3).PROCMMOVE(I%,1)
930 PROCMPLOT(I%,4):PROCMPLOT(I%,5)
940 PROCLINE(I%)
950 ENDPROC
960 DEFPROCMMOVE(I%,J%)
970 K%=P%(I%,J%):MOVE S(K%,1),S(K%,2)
980 ENDPROC
990 DEFPROCMPLOT(I%,J%)
1000 K%=P%(I%,J%):PLOT85,S(K%,1),S(K%,2)
1010 ENDPROC
1020 DEFPROCLINE(I%)
1030 GCOL0,3:PROCMMOVE(I%,1)
1040 FOR J%=2 TO NP%(I%)
1050   K%=P%(I%,J%):DRAW S(K%,1),S(K%,2)
1060   NEXT J%:K%=P%(I%,1)
1070 DRAW S(K%,1),S(K%,2)
1080 ENDPROC
1090 REM Coordinate,Point & Plane Data
     for House
1100 DATA 200,-200,-200,200,-200,200
1110 DATA 200,200,200,200,200,-200
1120 DATA -200,200,-200,-200,200,200
1130 DATA -200,-200,200,-200,-200,-200
1140 DATA 0,200,300,0,-200,300
1150 DATA 4,4,4,5,5,4,4
1160 DATA 1,2,3,4,1,8,5,4,5,6,7,8
1170 DATA 4,7,9,6,5,1,2,10,7,8
1180 DATA 2,10,9,3,7,10,9,6
1190 DATA 1,1,1,0,0,1,1
```

# Play the numbers game

***Nigel Littlewood** presents a simple quiz game for the unexpanded Vic20*

This is a simple number quiz for the Vic20 all the user has to do is orientate the numbers one to eight in the grid displayed on the screen

However, the numbers must be placed so that no consecutive numbers are next to each other either vertically, horizontally or diagonally

There are four possible solutions to the quiz, which the computer will test for

Upon getting a correct solution your number of attempts will be displayed together with the amount of time you took

**Program notes**

| | |
|---|---|
| 10-30 | Initialisation of variables and instructions |
| 40-240 | Displays the grid |
| 310-416 | Number entry routine and correct sequence check |
| 462 | Error display |
| 600-635 | Correct sequence display |
| 700-710 | Data statements for positioning of answers and correct number sequences |

```
0 GOTO 10
1 *******************
2 BY NIGEL LITTLEWOOD
3 NUMBER QUIZ (C)
4 DATE 15/7/82.......
5 *******************
10 TI$="000000" S1=36076 POKES1+2,15 POKES1+3,0 PRINTCHR$(14)"
"
11 PRINT"      ____________"
12 PRINT" THE OBJECTIVE OF THE GAME IS TO ARRANGE THENUMBERS 1 TO 8 SO THAT",
13 PRINT"NO CONSECUTIVE NUMBERSARE NEXT TO EACH OTHEREITHER VERTICALY, HOR-IZON
TALY, ",
15 PRINT"DIAGONALY OR IN REVERSE ORDER." PRINT"ANY KEY TO CONTINUE."
30 GETA$ IFA$=""THEN30
40 PRINTCHR$(142)""
100 PRINT"      NUMBER QUIZ     "
101 PRINT"      ____________"
204 PRINT"          ____      "
208 PRINT"         A  B |     "
210 PRINT"        | X | X |   "
212 PRINT"      __|___|___|___"
216 PRINT"      C  D  E  F |  "
220 PRINT"      | X | X | X | X | "
224 PRINT"      |___|___|___|___| "
228 PRINT"         G  H |     "
232 PRINT"        | X | X |   "
236 PRINT"        |___|___|   "
240 PRINT"                    SQUARE"
300 POKE198,0 POKES1,0 RESTORE FORC=1TO8 POKE8061,C
310 GETF$ IFF$<"1"ORF$>"8"THEN310
312 A(C)=VAL(F$) READB POKEB,48+A(C) NEXTC W=W+1 FORQ=1TO4 L=0 FORE=1TO8 READK
415 IF A(E)=KANDQ<5THENNEXT IFL=0THEN600
416 L=L+1 NEXT IFL>0ANDQ<5THENNEXT
462 PRINT"          WRONG", POKES1,128 FORX=1TO1500 NEXT PRINT"          "
 GOTO300 .
600 PRINT"     THAT IS CORRECT"
605 PRINT"IT TOOK YOU"W "GUESSES"
606 PRINT"YOUR TIME WAS  -      HOURS ",LEFT$(TI$,2)
607 PRINT"MINS  ",MID$(TI$,3,2)
608 PRINT"SECS  ",RIGHT$(TI$,2)
610 PRINT"WOULD YOU LIKE TO TRY  AND GET ANOTHER OF   THE SOLOUTIONS."
612 FORO=1TO4 POKES1-1,200 FORY=1TO300 NEXT POKES1,200 FORY=1TO300 NEXT
613 POKES1,0 NEXT POKES1-1,0 FORR=130TO254 POKES1,R FORK=1TO40 NEXTK,R POKES1,0
615 PRINT"'N' TO EXIT."
630 GETU$ IFU$=""THEN630
631 IFU$="N"THENPRINT"  BYE FOR NOW !!" END
635 RUN
700 DATA7798,7001,7861,7864,7867,7870,7930,7933
710 DATA4,6,7,1,8,2,3,5,3,5,7,1,8,2,4,6,5,3,2,8,1,7,6,4,6,4,2,8,1,7,5,3
```




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[illegible] the Pyramid [illegible] increasing with the depth of [illegible] to have a different game every time you play.

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# Bit by bit

***Pete Gerrard** guides you through the intricacies of hi-res graphics on the 64*

As you know the screen display on your Commodore 64 is 40 columns wide and 25 rows deep. Since each character space is made up of an eight pixel by eight pixel grid, this gives a maximum resolution of (40 × 8) wide and (25 × 8) deep, or 320 by 200.

To use the high resolution screen, obviously we are going to have to manipulate every pixel on the screen, and determine whether each pixel is to be turned on or off. On this depends the colour that will be displayed in that particular pixel location.

To keep track of this requires a lot of memory, 8,000 bytes for each screen display in fact, as we have to control 320 × 200 pixels, or 64,000 of them! As there are eight bits in a byte, this gives us our figure of 8,000 bytes per screen.

### Basic versus Machine Code

One drawback of using bit mapping from Basic is that everything is so slow. With nearly 8K to control, this is hardly surprising and most of the work in bit mapping is best done from machine code. However, since delving into machine code straight away can be a little terrifying, we'll start with Basic.

What we are attempting in this article is basically to transfer an 8K section of your computer's memory directly on to the screen, thereby determining whether each bit on the screen is on or off.

### Standard Bit Mapping

As with all normal character displays on the screen, standard mode trades off colour in favour of greater resolution, the full 320 by 200 in fact, but with only two colours per eight pixel by eight pixel grid. Bit map mode is turned on with the following command

*Poke 53265, Peek (53265) OR32*

and turned off with

*Poke 53265, Peek (53265) AND223*

Obviously we're going to have to get the information from somewhere, and for this we'll have to clear out a section of memory. The usual area used is from memory location 8192 upwards, so to clear out our 8K we must

*For I = 8192 To 8192 + 7999: Poke I,0: Next*

Now we have to select some colours, and the colour displayed on the screen in this mode is determined not by the colour memory, but by the actual content of each screen memory location. The value *Poked* into a screen location produces the background colour by using the lower four bits of the value, and the pixel colour from the upper four bits. Thus each screen character space can have two colours in it, and throughout the screen we can use any of the 16 colours.

Before printing anything on the screen, we need to tell the screen where our bit map is stored, and this is done using

*Poke 53272, Peek (53272) OR8*

which puts the bit map at locations 8192 through to 16191.

If we don't tell the screen where to go though, interesting things happen! For instance, *Poke* 53265,59 will show the top half of the screen containing the bit map for the first 4096 memory locations, and the bottom half the bit map from the character generator area. You can actually watch it all change up at the top, as page zero continues to monitor what's happening. The following line

*For I = 8192 To 8511 Step 8: Poke I,255: Next I*

will now produce a hi-res line across the top of the screen, given that we are still looking at locations 8192 and above for our hi-res area. Or again

*For I = 1024 To 2023: Poke I,4: Next I*

will produce a purple hi-res screen.

To determine whether any particular pixel is to be on or off, we will need to find it on the screen, and the following formula will show you where any pixel is located, assuming we want it to be at X location horizontally, and Y location vertically.

```
R = INT (Y/8)       find the row
C = INT (X/8)       find the character position
L = Y AND 7         the line of that character position
B = 7 - (XAND7)     the bit of that byte
```

Putting them all together gives us the byte where any pixel with the co-ordinates X,Y is situated

*Byte = 8192 + R * 320 + C * 8 + L*

and to turn any X,Y co-ordinate bit on in that eight by eight space we

*Poke Byte, Peek (Byte) Or (2 to the power B)*

We will now use some of these ideas to get the 64 to draw a hi-res cos wave

```
5 POKE 53272, PEEK (53272) OR8
7 POKE 53265, PEEK (53265) OR32
10 FOR I = 8192 TO 8192 + 7999: POKE I,0: NEXT
12 FOR I = 1024 TO 2023: POKE I,1: NEXT I
15 FOR X = 0 TO 319
20 Y = INT (100 + 80 * COS (X/16))
25 C = INT (X/8): R = INT (Y/8): L = YAND7
30 BYTE = 8192 + R * 320 + 8 * C + L
40 B = 7 - (XAND7)
50 POKE BYTE, PEEK (BYTE) OR (2 to the power B)
60 NEXT X
70 POKE 1024,16: END
```

### Multi-Colour Bit Mapping

This is similar to multi colour mode in ordinary graphics, in that we are allowed to have up to four colours per eight pixel by eight pixel grid, but we have to suffer a halving of the horizontal resolution available, down to 160 by 200 pixels.

Again, we are using an 8K section of memory, and our four colours are chosen from: screen background colour register 53281; character screen position, where the upper four bits give us one colour, the lower four another; colour memory.

To turn multi-colour bit mapping on we must

*Poke 53265, Peek (53265) OR32: Poke 53270, Peek (53270) OR16*

and to turn it off again

*Poke 53265, Peek (53265) And 223: Poke 53270, Peek (53270) And 239*

### Moving the Screen About

It is possible to move the screen either horizontally or vertically in either direction, one pixel at a time.

The 64 normally displays a screen that is 40 columns across and 25 rows down, but in order to scroll in either direction we can change this into a 38 by 24 display, in order to give the screen information somewhere to go to, and somewhere to come from.

To get the 38 column screen display we must enter

*Poke 53270, Peek (53270) AND 247*

and to switch it off we must

*Poke 53270, Peek (53270) OR8*

To get to a 24 row screen display, we must enter

*Poke 53265, Peek (53265) AND 247*

and to go back to 25 rows again

*Poke 53265, Peek (53265) OR8*

You will see the screen border expand and shrink accordingly, in order to accommodate the screen manipulation. To scroll horizontally, we must

*Poke 53270, (Peek (53270) AND 248) + X*

where X is the screen position from 0 to 7, and to scroll vertically

*Poke 53265, (Peek (53265) AND 248) + Y*

where Y is the Y position of the screen from 0 to 7. To illustrate these features here are a few examples.

Values in the range 24 to 31 actually control the vertical position of the characters on the screen, so

*For J = 24 TO 31: Poke 53265,J: Next J*

will set the screen moving downwards, leaving an empty space near the top. *Poke* 53265,27 to get back to normal.

To illustrate 24 column mode, type *Poke* 53265,19, which cuts the top and bottom lines in half: this is the basis of all these scrolling operations. Switch to a 24 character screen, move everything up slowly, then jump back to a 25 character screen again, and so on.

Finally, to turn the screen off completely, type *Poke* 53265,11. *Poke*ing 53265 with 27 always sets everything back to normal again.

Obviously there is a lot to learn and I have found the best way to understand it all is just to play around, taking notes of everything you do and the results that follow. Next week we'll take a look at the other important graphics feature of the Commodore 64 — Sprites. ■

*Open Forum* is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the *Program of the Week* double our new fee of £6 for each program published.

## Nasty Ned

on Spectrum

The object of this game is to catch the falling bombs before they hit the ground and explode, using a bucket of water, held by your bomb experts!

You have three lives to catch as many bombs as possible but every so often Ned gets nastier and nips off part of the bank giving you less time to intercept the falling bombs!

*Run* 100 before playing to initialise the UDGs.

### Program Notes

| | |
|---|---|
| 1-50 | Select instructions |
| 100-160 | Build UDG set |
| 170-240 | Initialise variables + Build Bank and Score Table |
| 250-290 | Movement Routine |
| 300 | Increase Level |
| 400-420 | Player Killed Routine |
| 500-540 | Instructions |

```
   1 REM     A Nastey Ned A
   2 REM
   3 REM   A © Mal Bullen A
   4 REM
   5 REM
   6 REM
   9 LET hi=0
  10 BORDER 7  PAPER 7  BRIGHT 0
  INK _  OVER 0  INVERSE 0  FLAS
H 0  CLS  PRINT AT 1,8 'A Naste
y Ned A" AT 1,10, OVER 1 ______

  20 PRINT AT 8 5  INK 4, Would
    like  AT 10 7, instructions
?  AT 12 9  INK 2.    INK U,
    YES  ,-  15 9  INK =  N  INK
6,
  30 IF INKEY$= y  OR INKEYS= Y"
 THEN GO TO 500
  40 IF INKEY$= n  OR INKEY$= 'N
 THEN GO TO 160
  50 GO TO 30
 100 RESTORE  FOR i=USR  a  TO
USR 'e +7  READ a  POKE i a  NEX
T i  GO TO 12
 110 DATA 2,6,8,56,124 124 124,5
6
 120 DATA 24 24,16 28 19,41 41 1
06
 130 DATA 0,0,0 0 255 255 255 0
 140 DATA 24 24,0 56,200,143,14
64
 150 DATA 255,255,129,129,129,25
5,255,255
 160 BORDER 5  PAPER 7  BRIGHT 0
  INK 0  CLS  DIM a(14 2)
 170 LET men=0  LET sc=0
 180 LET level=1
 185 LET a(1,1)=level+4  LET a(1
,2)=  LET c=1  LET b 1  FOR i=2
 TO 14  LET a(i,2)=a(i-1,2)-4+IN
T (RND*8)  LET a(i,1)=level+4  I
F a(i,2)<4 THEN LET a(i,2)=a(i,2
)+5
 187 IF a(i,2)>16 THEN LET a(i,2
)=a(i,2)-5
 188 IF a(i,2)=a(i-1,2) THEN LET
 i=i-1  NEXT i
 190 NEXT i  PRINT AT 5 21, INK
0,          ,AT 6 21,    INK 4,
FLASH 1  INVERSE 1,        , IN
VERSE 0, FLASH 0, INK 0,   ,AT 7
21,         ,AT 8,21,   , INK
4, FLASH 1,"HIGH   FLASH 0, INK
0,       ,AT 9,21,           ,AT 10
21,
 200 PRINT INK 0,AT 10,23, OVER
1  !   !   INK 2  FOR i=15 TO 11
STEP -1  BEEP .1,i+12  PRINT AT
i,21,'EEEEEEEE'  NEXT i  PRINT A
T 13,23, INK 3,"B", INK 5, "C", I
NK 3 'D'  INK 2  FOR i=16 TO 4+
level STEP -1  FOR j=4 TO 16  BE
EP .02,j-i  PRINT AT i j, E   N
EXT j  NEXT i
 210 PRINT AT 16,9,    ,AT level
+1,7,          ,AT level+2,7,    ,
INVERSE 1  BANK  INVERSE 0
AT level+3 7,           AT level+3
 9, OVER 1,      INK 0  LET y=9
 230 PRINT AT 17,y, INK 3, B , I
NK 5,"C"  INK 3,'D'  FOR i=1 TO
 IF a(i,1)<>0 THEN PRINT AT a(i
,1),a(i,2), INK 2, E ,CHR$ 8,(
  AND (a(i,2)=9 AND a(i,1)=16)
,1   AND (a(i,2)=10 AND a(i,1)=
16))  LET a(i,1)=a(i,1)+1  BEEP
.002 56-i
 240 IF ATTR (a(i 1) a(i,2))=61
THEN LET sc=sc+10  LET c=c+1
T b b+(i 14)  PRINT AT 5    , a
  2),  OVER 1  FLASH 1  INK 3,
  BEEP .01,0  BEEP .02,-2  PRIN
T AT a i 1  a(i 2)  OVER 1  INK 5
 A  LET a(i,1)=0  IF i=14 THEN
 GO TO 300
 250 IF a(i,1)>0 THEN PRINT AT a
(i,1),a(i 2), INK 0 'A  LET b=b
+(b-c<level+1 AND a(i 1)=level+
 AND b<14)
 260 IF a(i,1)>16 THEN BEEP .5 -
35  GO TO 400
 260 IF sc>hi THEN LET hi=sc
 270 PRINT INK 5,AT 7,23, BRIGHT
 1  0000 ( TO 4-LEN STR$ sc),sc,
AT 9,22,'0000 ( TO 4-LEN STR$ hi
) hi,AT 14,24,'00 ( TO 2-LEN STR
$ men),men
 280 IF LEN INKEY$ THEN FOR q=1
TO 3  BEEP .001,50+LEN INKEY$  L
ET y=y-(INKEY$= 5  AND y>3)+(INK
EY$= 8  AND y 15)  PRINT AT 17 y
-1, INK 3   B , INK 5,"C , INK 3
 D   NEXT q
 290 NEXT i   GO TO 220
 300 CLS   PRINT AT 10,4, BRIGHT
 1, INK 2,"Ned s Gettin  Nastier
    BEEP .1,2  BEEP .3 4  BEEP
1 2  BEEP .3,3  BEEP .5,0  LET l
evel=level+1  PAUSE 40  LET leve
l=level-(4 AND level=5)  CLS  G
O TO 185
 400 PRINT AT 17,y, FLASH 1, BRI
GHT 1, INK 3, B , INK 5  C , INK
 3 'D'  FOR n=24 TO -12 STEP -1
 BEEP .02,n  NEXT n  LET men=men
-1  FOR z=1 TO 14  PRINT AT a(z
1),a(z,2), INK 2,("E" AND a(z,1)
>level+4)  LET a(z,1)=level+4-(l
evel+4 AND a(z,1)=0)  NEXT z  PR
INT AT 16,9, INK 6,    ,AT 17,0,
TAB 31  BEEP .1,2  BEEP .2,4  BE
EP 1 2  BEEP 2 1  BEEP .1   B
EEP .5,0  IF men>0 THEN GO TO 24
0
 410 PRINT AT 10,6, BRIGHT 1, FL
ASH 1, INK 6  GAME OVER
 420 BEEP .1,0  BEEP .2 1  BEEP
.1 0  BEEP .4,2  BEEP .4,0  PAUS
E 40  CLS   GO TO 10
 500 BORDER 0  PAPER 0  INK 2  B
RIGHT 1  CLS  PRINT AT 0,8,'A N
astey Ned A',AT 0,10. OVER 1, __
             INK 5
 510 PRINT '     Nastey Ned has
escaped from   prison and has ta
ken over the   bank , from which
 he is          dropping bombs !
 ..   Your task is to catch as m
any bombs as you can in your
    'diffussing' bucket , Scorin
g    10 pts. per bomb ....   Yo
u have 3 lives to do your   best
 , By the way , Ned gets    nast
ier the more bombs you      catc
h !"
 520 PRINT ''   Use the cursor k
eys for         movement'   PRE
SS ", INK 2,"SPACE ; INK 6,' TO
START"
 530 IF INKEY$=' " THEN GO TO 16
0
 540 BEEP .01 RND*30+30  GO TO 5
30
```

**Nasty Ned**
by M Bullen

## Percentage Rete

### on Dragon

When a sum of money (PV) is repaid by n monthly instalments of P at monthly interest i the variables are related like this

$$P = PV \frac{i}{1-(1+i)^{-n}}$$

If all these are known except the interest rate you cannot rearrange the equation so that the unknown, i appears on one side only. The program finds the equivalent annual rate by trial and error. Readers with a building society mortgage will know that societies have an idiosyncratic way of applying their notional rate. It is interesting to see what your true mortgage rate is!

**Program notes**

| | |
|---|---|
| 50 | Sets a starting point for annual rate and trial difference |
| 60 90 | Convert APR into monthly (decimal) rate |
| 100 130 | Test the expression against the known value of P and adjusts rate accordingly |

```
1  PROGRAM TO FIND A.P.R.
2 'PETER STORY
10 CLS
20 INPUT "TYPE THE MONTHLY INSTALMENT";P
30 INPUT "TYPE THE TOTAL BORROWED";PV
40 INPUT "TYPE THE NUMBER OF MONTHS",N
50 I=15:DIFF=15
60 I1=I/100
70 I2=1+I1
80 I3=I2^(1/12)
90 I4=I3-1
100 P1=PV*I4/(1-I3^(-N))
110 IF P1-P<0.0001 AND P1-P>-0.0001 THEN PRINT I:STOP
120 IF P1<P THEN PRINT I;P1;P:I=I+DIFF:DIFF=DIFF/2:GOTO60
130 IF P1>P THEN PRINT I;P1;P:I=I-DIFF:DIFF=DIFF/2:GOTO60
```

**Percentage Rate**
*by Peter Story*

## Apple Munch

### on Vic20

This game will run on the unexpanded Vic. The program uses user defined graphics and sound. Rems can be left out.

**Program notes**

| | |
|---|---|
| 0-4 | Rems |
| 7 | Disables the Commodore key |
| 8-12 | Do you want instructions? |
| 15-65 | Hi-res graphics |
| 66-110 | Sets up screen |
| 150 | Sets timer |
| 160-210 | Key press check |
| 220 | Gets correct subroutine |
| 1000 | Congratulations |
| 10000 | Failed! |
| 20000 | Player stuck |
| 30000 | Instructions |

**Variables**

| | |
|---|---|
| I | Main loop variable |
| O | Checks for crash and player using ammo |
| A$ | Movement |
| V | Subroutine variable |
| A | Read variable |
| TI$ | Internal clock |

NB Maximum for crashes and ammo is five

```
0 REM PHILIP BIDWELL.
1 REM  20,HOUGH LANE,
2 REM   LEYLAND.
3 REM    LANCS.
4 REM     PR5 1SD.
5 PRINT"□"
6 POKE36878,15
7 PRINTCHR$(8)
8 POKE36879,27
9 PRINT"▓▓▓▓______________________"
10 PRINT"DO YOU WISH TO SEE THE    INST
FUCTIONS(Y/N)"
11 PRINT"______________________"
12 INPUTY$
13 IFY$="Y"THENGOSUB30000
14 PRINT"□"
15 POKE36869,255
25 POKE52,24 POKE56,28 CLR
30 FORI=1TO32 READA POKE7167+I,A NEXT
40 DATA255,255,255,255,255,255,255,255
50 DATA60,126,90,126,60,36,102,0
60 DATA2,16,124,250,242,246,124,56
65 DATA0,0,0,0,0,0,0,0
66 PRINT"□▓@@@@@@@@@@@@@@@@@@@@@@"
70 FORI=1TO250 POKE36876,200 FORT=1TO15
 NEXT POKE36876,0
80 LETQ=INT(RND(1)*506)+1
90 POKE7680+Q,0 POKE7680+Q+30720,0
100 NEXT
110 FORI=8164TO8185 POKEI,32 FORI=8164
TO8185 POKEI,3 NEXT
120 A=7680 B=8175 C=30720 D=38895
130 POKEA,2 POKEA+C,5
140 POKEB,1 POKEB+C,2
150 TI$="000000"
160 GETA$ IFA$=""THEN160
170 IFA$="■"THENV=1
180 IFA$="Z"THENV=2
190 IFA$="C"THENV=3
200 IFA$="*"THENV=4
210 IFA$="←"THENV=5
220 ONVGOSUB300,400,500,600,20000
230 IFPEEK(A)=1THENGOTO1000
240 GOTO160
300 IFPEEK(B-22)=0THENGOSUB800
310 POKEB,3 D=D-22 B=B-22 POKED,1
320 POKEB,1 POKED,2 GOSUB2000 RETURN
400 IFPEEK(B-1)=0THENGOSUB800 RETURN
410 POKEB,3 B=B-1 D=D-1
420 GOTO320
500 IFPEEK(B+1)=0THENGOSUB800 RETURN
510 POKEB,3 B=B+1 D=D+1 GOTO320
600 G=G+1 IFF>1THENRETURN O=O+1 POKE368
76,15 FORI=170TO240STEP3 POKE36876,1 NE
XT I
601 POKEB-22,32 POKEB-22,3
610 POKE36876,0
800 POKE36877,225 FORI=15TO0STEP-.7 POK
E36878,I
810 FORW=1TO99 NEXTW,I POKE36877,0 POKE
36878,0 O=O+1:IFO=>5THENGOTO10000 RETUR
N
```

```
899 GOTO 160
1000 POKE36669,240 PRINT"WELL DONE!
YOU HAVE   SUCCESSFULLY MUNCHED  THE AP
PLE."
1005 S=VAL(TI$)
1010 PRINT"& TOOK JUST ",S;"UNITS OF TI
ME."
1020 PRINT PRINT
1030 PRINT"DO YOU WISH TO PLAY
     AGAIN '
1040 GETR$ IFR$=""THEN1040
1050 IFR$="Y"THENRUN
1060 IFR$="N"THENPOKE36879,27 PRINT""
END
2000 POKE36878,15 FORP=1TO19 POKE36876,
185 NEXT POKE36876,0 POKE36879,0 RETURN
10000 POKE36869,240 PRINT"
'
10010 PRINT"I M VERY SORRY BUT YOUUSED
UP ALL YOUR AMMO OR CRASHED TOO MANY
TIMES."
10015 PRINT"______________________"
10020 GOTO1020
20000 POKE36669,240 POKE36879 25 PRINT'
'
20010 POKE36678,15
20020 K$="TOUGH LUCK!I BET YOU  THOUGHT
IT WAS GOING  TO BE EASY DID NT YOU."
20030 FORI=1TOLEN(K$)
20040 L$=MID$(K$,I,1) IFL$=" "THEN20070
20050 PRINT"',
20060 POKE36875,225 FORH=1TO20 NEXT POK
E36875,0 FORH=1TO10 NEXT
20070 PRINTL$  NEXT
20080 PRINT"'
20090 GOTO1020
30000 PRINT"     APPLE MUNCH"
30010 PRINT
30020 PRINT"THE OBJECT OF THE GAMEIS TO
TRY TO EAT THE  JUICY APPLE AT THE TOP"
30030 PRINT"LEFT OF THE SCREEN.IF YOU F
IND THAT AN      OBSTRUCTIONS IS"
30040 PRINT"BLOCKING YOUR PATH     THEN
GET RID OF IT BY PRESSING '* "
30050 PRINT"MOVEMENT -'
30060 PRINT""
30070 PRINT"F1-UP    -RIGHT'
30080 PRINT'"
30090 PRINT'-LEFT   -STUCK"
30100 PRINT' PRESS A KEY TO PLAY"
30110 GETV$ IFV$=""THEN30110
30120 RETURN
33332 REM(C) F.BIDWELL
33333 REM**THE  END**
```

**Apple Munch**
*by Philip Bidwell*

## Refraction

### on Spectrum

Andrew Thompson's program for the refraction of light (PCW 30 June - 6 July) inspired this program. This particular version draws the interface between the two media (lines 210 and 220) the normal to the surface (lines 230 to 250) the incident ray (lines 260 and 270), the refracted ray (lines 280 and 290) marks them in with arcs (lines 300 to 330) and labels them (lines 340 and 350)

It is a simple matter to colour the different rays in order to make them easily distinguishable

```
REFRACT-
ION OF
 LIGHT
  10 REM REFRACTION
  20 PRINT  IN THE FOLLOWING ENT
ER N,I AND R'
  30 PAUSE 500
  40 CLS
  50 PRINT 'ENTER 0 FOR THE UNKN
OWN VALUE
  60 PAUSE 500
  70 CLS
  80 PRINT 'INPUT REFRACTIVE IND
E  INPUT N
  90 CLS
 100 PRINT 'INPUT ANGLE OF INCID
ENCE'  INPUT I
 110 CLS
 120 PRINT  INPUT ANGLE OF REFRA
CTION'  INPUT R
 130 CLS
 140 IF N*I*R<>0 THEN GO TO 20
 150 LET I=I*PI/180
 160 LET R=R*PI 180
 170 IF N=0 THEN LET N=(SIN I)/(
SIN R)
 180 IF I=0 THEN LET I=ASN (N*SI
N R)
 190 IF R=0 THEN LET R=ASN (SIN
I/N)
 210 PLOT 0,87
 220 DRAW 255,0
 230 FOR Z=50 TO 125 STEP 5
 240 PLOT 127,Z
 250 NEXT Z
 260 PLOT 127,87
 270 DRAW -80*SIN I,80*COS I
 280 PLOT 127,87
 290 DRAW 80*SIN R,-80*COS R
 300 PLOT 127,117
 310 DRAW -30*SIN I,-30*(1-COS I
),I
 320 PLOT 127,57
 330 DRAW 30*SIN R,30*(1-COS R),
R
 340 PRINT AT 5,INT ((127-21*SIN
 I)*31/255), "I"
 350 PRINT AT 17,INT ((127+27*SI
N R)*31/255), R'
 360 LET I=I*180/PI
 370 LET R=R*180/PI
 380 PRINT AT 18,0,"N=",N
 390 PRINT AT 19,0,"I=",I
 400 PRINT AT 20,0 "R=",R
```

**Refraction**
*by Graham Young*

## Snake

### on Lynx

Snake is a two player game written for the Lynx. The instructions are included in the program. Note that if you reverse direction, doubling back on yourself, then you hit your own tail and lose the round. The scoring system is such that the less points you have, the better. The number of points gained depends on the time taken to crash into something, so the sooner you can force your opponent to crash, the more points you gain.

If you wish to move diagonally, then press and hold down two keys together. This works because the program reads the keyboard by means of the *Inp* function, as *KeyN* and *Key$* do not allow multiple key presses to be detected.

The procedure which is probably of most interest to users is *Proc point*. It finds the colour of the point with co-ordinates (x, y) and returns this value in variable c.

It works by calling *Rom* routines to read the three colour banks comprising the screens memory, and combining the contents of these banks to obtain the colour number.

**PROGRAM OF THE WEEK**

```
100 PROC INSTR
110 REPEAT
120   LET G=0,V=0
130   REPEAT
140     PROC SETUP
150     WHILE d=GREEN AND e=GREEN
160       PROC MOVE
170       PROC DIRECTION
180       PROC INCR
190       PROC CHECK
200     WEND
210     BEEP 2000,100,63
220     LET N=3000 DIV t
230     IF d GREEN THEN  LET W=1,G=G+N
240     ELSE  LET W=2,V=V+N
250     INK BLACK
260     PRINT  @ 12,30; Player  W   wins
 !";
270     PRINT  @ 33,5 G  @ 50,5;V;
280     PAUSE 30000
290   UNTIL G>99 OR V>99
300   BEEP 200*W,200/W,63
310   PRINT  @ 4,45; Player  W;" is the
overall  winner " ,
320   PAUSE 50000
330 UNTIL FALSE
340 DEFPROC MOVE
350 INK RED
360 DOT A,B
370 INK YELLOW
380 DOT E,F
390 DOT E+1,F
400 INK BLUE
410 DOT P,Q
420 INK CYAN
430 DOT T,U
440 DOT T+1,U
450 BEEP 24,10,63
460 ENDPROC
470 DEFPROC DIRECTION
480 LET J=H M=K,N=X,Z=Y
490 LET H INT((NOT(INP(&0080) BAND &001
0) DIV &0010) (NOT(INP(&0080) BAND &002
0) DIV &0020))
500 LET K INT((NOT(INP(&0200) BAND 8) D
IV 8) (NOT(INP(&0080) BAND &0010) DIV &
0010))
510 LET X INT((NOT(INP(&0080) BAND &002
0) DIV &0020)-(NOT(INP(&0980) BAND 4) D
IV 4))
520 LET Y INT((NOT(INP(&0480) BAND 8) D
IV 8) (NOT(INP(&0280) BAND &0020) DIV &
0020))
530 IF H=0 AND K=0 THEN  LET H=J,K=M
540 IF X=0 AND Y=0 THEN  LET X=N,Y=Z
550 ENDPROC
560 DEFPROC INCR
570 LET E C,F=D,C A,D B
580 LET A A+H B B+K
590 LET T R,U S,R=P S Q
600 LET P=P+X,Q=Q+Y
610 LET t=t+1
620 ENDPROC
630 DEFPROC CHECK
640 PROC POINT(A,B)
650 LET d=c
660 PROC POINT(P Q)
670 LET e c
680 ENDPROC
690 DEFPROC SETUP
700 WINDOW 3,123,15,245
710 VDU 2,MAGENTA,4,2,GREEN,23,30
720 FOR B=1 TO 22
730   PRINT
740 NEXT B
750 LET t 0
760 LET A=10,B 128 C=A,D=128 E=A,F=130
770 LET P=234 Q=130,R=P,S=128,T=P,U=126
780 INK RED
790 DOT C,D
800 INK BLUE
810 DOT R,S
820 LET H=0 K=-1
830 LET X 0,Y 1
840 LET d=GREEN e=d
850 VDU 1,BLACK,2,MAGENTA
860 PRINT  @ 3,5, Player 1   G  TAB 20;
Player 2   V
870 ENDPROC
880 DEFPROC INSTR
890 WINDOW 3,123,5,245
900 TEXT
910 PRINT  TAB 17,CHR$(24)"SNAKE" ,CHR$(2
5);
920 INK BLUE
930 PROTECT YELLOW
940 PRINT  @ 3,35; The object of the gam
e is to surround
950 PRINT  your opponent, forcing him to
 hit your
960 PRINT 'tail, his tail or the border.

970 PROTECT BLACK
980 VDU 1,RED,31
990 PRINT  TAB 15, CONTROLS
1000 VDU 1 YELLOW,31
1010 PRINT "PLAYER 1
1020 PRINT  Cursor down  Left
1030 PRINT  Cursor up    Right
1040 PRINT  S            Up
1050 PRINT  Z            Down
1060 VDU 1,CYAN,31
1070 PRINT  PLAYER 2
1080 PRINT  Cursor left  Left
1090 PRINT  Cursor right Right
1100 PRINT  ,            Up
1110 PRINT  /            Down
1120 VDU 1 MAGENTA,3)
1130 PRINT  TAB 3,CHR$(16) PRESS ANY KEY
 TO START ,CHR$(18),
1140 LET A$ GET$
1150 ENDPROC
1160 DEFPROC POINT(x,y)
1170 LET a x DIV 8+32*y,b=2**(7-x MOD 8)
1180 CALL &0069,&A000+a
1190 LET c=(HL BAND b) DIV b
1200 CALL &0069,&C000+a
1210 LET c=c+(HL BAND b) DIV (b/2)
1220 CALL &0070,&C000+a
1230 LET c=c+(HL BAND b) DIV (b/4)
1240 ENDPROC
```

**Snake**
*by Chris Cytera*

## Decay

### on Spectrum

This program will demonstrate radioactive decay and was written by me in conjunction with a physics A level syllabus. The program can be run on any ZX Spectrum (either 16 or 48K) and will produce a table of results either on a ZX printer or on the screen.

**Program notes**

| | |
|---|---|
| 10-20 | Print out introduction letter by letter with sound effects to make it more interesting |
| 30 | Sets dimensions for array (c) used to store number of atoms remaining — used to plot graph |
| 40 | Fills the screen while number of atoms etc are entered |
| 50-80 | Enter number of dice and number of sides each |
| 90 | Sets a$ to hold column titles |
| 100-150 | Decide if output is on TV or printer |
| 160 | Prints title |
| 170 | And column titles |
| 180 | And initial values |
| 190 | Sets variable |
| 200-215 | Main loop |
| 270 | See if loop needs to be done again |
| 280 | Closes printer only channel |
| 290-340 | Draw graph on screen sideways to fit on all values with ink paper the same colour so it is invisible then graph is copied onto printer |

*Note*: screen display can be made visible by entering the following: For N = 22528 To 23296: Poke N,56: Next N

**Variables**

a$ introduction +column titles
B$ choice of printer/tv output
A loops B number decayed C array F time N loops Y number of sides dice Z initial number of dice

```
  1 REM Radioactive Decay
      © JAMES TIMMS 1983
 10 LET A$="This is a computer
simulation    of an experiment to
 show radio-  active decay .In th
e original    experiment,a number
 of dice ,    each having only on
e side        coloured are thrown
.If the       coloured side of a
die lands     uppermost,it is rem
oved and      said to represent a
n atom that   has decayed.The num
ber of atoms  decayed and the tim
e are         recorded.The throws
 are repeated until all of the at
oms can be    said to have decaye
d."
 20 FOR n=1 TO LEN a$: PRINT a$
(n);: BEEP .01,10: NEXT n: PAUSE
 750: CLS
 30 DIM C(150)
 40 FOR N=1 TO 11: PRINT PAPE
R 2; INK 6; FLASH 1;"  RADIO
ACTIVE DECAY  COMPUTER
-DICE SIMULATION   ";: NEXT N
 50 INPUT "How many atoms ? ",Z
 60 IF Z<=0 THEN GO TO 50
 70 INPUT "How many sides to di
ce ? ",Y
 80 IF Y<4 THEN GO TO 70
 90 LET a$="  TIME   DECAYED
ATOMS LEFT"
100 PRINT "ZX PRINTER NEEDS TO B
E CONNECTED     TO OBTAIN A GR
APH": BEEP .1,6: PAUSE 100: CLS
110 POKE 23658,8: REM [illegible]
120 INPUT "Do you want the resu
lts put on    the printer ? (y/n)
",b$
130 IF b$="Y" THEN PRINT AT 10,
0;"Output is now on the printer.
": OPEN #2,"P": GO TO 160
140 IF b$="N" THEN CLOSE #2: GO
TO 160
150 GO TO 110
160 PRINT AT 19,0;"[illegible]
[illegible]"
170 PRINT AT 20,0;A$
180 PRINT TAB 3;"0";TAB 11;"0";
TAB 22;Z
190 LET B=0: LET F=0
200 FOR A=B TO Z
210 IF INT (RND*Y)+1=Y THEN LET
B=B+1: BEEP .01,0
215 NEXT A
220 LET F=F+1
230 POKE 23692,255: REM [illegible]
240 PRINT TAB 3;F;TAB 11;B;TAB
22;Z-B
250 IF F=21 AND B$="N" THEN PR
INT AT 0,0;A$;AT 21,0;" "
260 IF F<150 THEN LET C(F)=Z-B
270 IF B<Z THEN GO TO 200
280 CLOSE #2
290 PAUSE 300: CLS
300 PAPER 7: INK 7: PLOT 0,167:
 DRAW 255,0: PLOT 0,0: DRAW 0,17
5
310 PRINT AT 0,10;"ATOMS REMAIN
ING"
320 LET A$="TIME": FOR A=10 TO
13: PRINT AT A,0;A$(A-9): NEXT A
330 FOR A=1 TO 150: PLOT 8+C(A)
/(INT Z/250),167-A: NEXT A
340 LPRINT "'Y' AXIS": COPY : I
NK 9
```

**Decay**
*by James Timms*

## Microradio

### GW6JJN



### Satellites

Each time I sit down to write this column I think of some new computer application in the field of radio. There are so many, from electronic design to keeping QSL records — the card a station sends you to acknowledge your contact. Even big stations like local radio or the BBC will send you a card if you let them know when and where you heard them. This week though I promised to talk about satellites — tracking them is one of the most interesting microcomputer applications I can think of.

So what is a satellite? Well, the moon is a satellite and to many amateurs, is an important means of communication. The EME or Earth Moon Earth system involves bouncing signals off the moon in the hope they will reach some exotic location.

We can track the moon quite easily, at most times it can be easily seen. It is with the man-made satellites that a computer can help most. The latest of these, OSCAR 10, was launched only a month or two ago. OSCAR stands for Orbiting Satellite Carrying Amateur Radio, but these are not the only kind whizzing around. There are weather satellites, military satellites and even one called UOSAT (OSCAR 9) featured in *PCW* 21-27 April and in the care of the University of Surrey. UOSAT is of particular interest since it transmits data, both pictures of the Earth's surface in a form that can be displayed on an ordinary TV, and speech from a voice synthesiser that can be heard with a VHF receiver. I have found it several times myself — a disembodied voice from space.

So how do we use a computer to find a satellite? Well, without a computer you must look up tables and work it out with a great deal of mathematical effort. By the time you've worked out its position it's moved and you have to start again.

At this point I must mention AMSAT UK. This is the UK version of the Amateur Satellite Organisation and they publish a marvellous book called *Satellite Tracking Software for the Radio Amateur*. The book consists of listings, applicable to most micros, to track most satellites. It costs less than £5 and is available from AMSAT UK, 94 Herongate Road, Wanstead Park, London E12 5EQ. AMSAT will also supply newsletters and information for the cost of membership which is currently £6.

Not much space to continue this week so keep your letters coming and if you have any ideas relevant to the column, or listings, then let me know. Views on commercial software packages for microradio would also be interesting. ■

**Ray Berry GW6 33N**

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share or topics that you would like to see covered write to Ray Berry, Microradio, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

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## Tony Bridge's Adventure Corner



# Adventure Int.

Back in 1978 microcomputing was an expensive hobby and the devotees a small band One of them worked at a Florida firm called Stromberg-Carlson making telephone digital switches Like many other people surrounded by large mainframe computers he counted the hours until he could get down to some serious after hours games playing

He discovered Adventure the classic game by Willie Crowther and Don Woods Intrigued by the unique blend of fantasy and logic he wanted to share his delight with his friends — but they, of course were not allowed near the sacrosanct machines

Back home, therefore the intrepid Adventurer sat down at his TRS-80 and translated the mainframe program to the micro, via an interpreter program that he wrote for the task

His wife meanwhile, was extremely fed up with the late nights the long hours at work and the early mornings spent hunched in front of the TRS 80 Grabbing the disk of the newly-written Adventure, she threw it in the oven

Fortunately for the rest of us she had forgotten to switch it on — and the couple are now several million dollars better off as a result

The wife was Alexis Adams, her husband was Scott, and the program was *Adventureland*

The first cassettes were mailed out in the Adams baby's bottle-liners — the quantities at first did not warrant special packaging and manufacturers were not interested in the small numbers This state of affairs, of course did not last long! Soon Scott Adams Computers opened the first shop in their retail chain, which is now known as Adventure International

Alexis Adams far from remaining anti-Adventure, actually went on to write in part the second program *Pirate Adventure* and most of the succeeding *Mystery Fun House* and *Voodoo Castle*

Mrs Adams is not a programmer and it was only possible for her to accomplish this with the aid of Scott's interpreter, which is at the core of AI's success This program is a skeleton structure which is flashed out with the details of the individual Adventure Information on rooms including the text together with objects exits and riddles is fed into the main program and what emerges is the full blown Adventure This is how many of the larger software houses write a series of Adventures

Back in Florida at the end of the 70s the Adams series was translated to the Apple a trend that has persisted to this day Now the series is available for the Commoddre machines as well as the Atari and the original Tandy and Apples

No word yet of versions for some of the other popular micros but AI surely cannot wait around much longer — they will be assured of a thousand-fold increase in sales, in the UK at least!

AI have not stood still on home ground however There are now several divisions which include mail order retail and business software as well as the Expo Division, which organises computer fairs The staff of 60 is presided over by Alexis and has become Alexis Adams Inc !

Adams himself, apparently still loves Adventure and his personal favourites are *The Count* and *Mystery Fun House* — which are yours?

Scott Adams has brought joy to many thousands of Adventure enthusiasts with his programs which he describes as fantasy computer novels in which the player controls the development of events Long may he continue to delight and frustrate us!

Alan Hunt has recommended several Adventures for the Vic20 that he has played and enjoyed First of all the Mysterious Adventure series from Leisuresoft The titles include *The Golden Baton The Time Machine* and *Arrow of Death* (Parts 1 and 2) These are advertised by Leisuresoft and also by Digital Fantasia — I imagine that they are the same programs!

Alan reckons that *Time Machine* is the best that he has tried so far The series which was written originally for the TRS-80 and Video Genie has been added to recently with the release of *Escape From Pulsar 7 Circus* and *The Feasibility Experiment*

Another Adventure that Alan has tried and seems to like is *Rescue From Castle Dread* from Terminal Software (I hope the name is not taken too literally!), and is one of three Adventures from them

This one must be written in Basic, as Alan has been able to alter the program to correct a small bug near the end — but he reckons that all these programs are good value for the Vic20

Finally this week The Hobbit Hall of Fame

1 Steve Howard

2 Robert Woods who agrees with other people that this is the best Adventure yet — this is not one of the world's best kept secrets Robert!

3 Richard Bourne who is also having trouble with the rope in *Planet of Death* — at the start Richard you should find a sharp flint Try using that it may help!

Not too many names this week, but with the recent release of *The Hobbit* for the Oric 1, Commodore 84 and BBC machines I'm looking forward to getting a flood of names shortly to add to the HHOF — although I'm sure that many people will be asking about the Goblin's Dungeon! Just remember a friend in need ■

This series of articles is designed for novice and experienced Adventurers alike Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter So if you have an Adventure you want reviewed or if you are stuck in an Adventure and cannot progress any further write to Tony Bridge Adventure Corner *Popular Computing Weekly* 12 13 Little Newport Street London WC2R 3LD

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## Adventure Helpline

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## BREAK DISABLE

*E A Duncan-Dunlop of Dan-y-Lan, Aberkonfig nr Bridgend writes*

**Q I wish to disable the Break key on my Spectrum. I thought I could do it if I Load — Ld A,9 Ld I,A, IM2 and then move the interrupt up to 65129, where I might convert the key press so that it would be ignored if I pressed *Break*. But this does not work. Which part of the system tests for Break?**

A A good guess but in some routines the Break key is accessed directly and not via an interrupt. In routines such as *Save*, *Load* and *Print* this is so; of course if you are not using the keyboard scan you are going to get nowhere by moving the interrupt. Only if you are using *Input* and *Inkey$* can you disable the *Break* key in the way you describe.

## PLUGGED PRINTER

*Andrew Bell of Trywood Road Thornton Cleveleys writes*

**Q I own a 16K Spectrum, and have recently bought a printer. I would like to leave my printer plugged in all the time but when I *Load* some games which auto-*Run*, the printer prints out the screen display. Could you please tell me why this happens, and how I can prevent it?**

A I doubt that you can prevent it. If you do not want to un-plug the printer then you might have to resort to taking out the paper carrier so there is nothing for it to print on.

I doubt whether the problem is as simple as the software house leaving a *Copy* command in the program; it is far more likely that for some reason they have diverted channel #3. This channel is used for such things as *Lprint* and *List*.

## SPECTRUM JOYSTICK

*Michael Hart of Broadway Dunscroft Doncaster South Yorkshire writes*

**Q I am taking an O-Level technology course, and as a project I am building a programmable joystick interface for my 48K Spectrum.**

**My problem is this — how can I use the port at the rear to send information into the keyboard buffer so as to simulate a key being pressed? I cannot make head or tail of the diagram in the manual, or understand how the keyboard buffer is used.**

A The Spectrum does not have a keyboard buffer. A key is pressed or read by the computer when both the data line and the address line return the value of 0. The Spectrum has 40 keys which are read by five data lines and eight address lines. These form a grid so that any key can only have one way of returning the value 0 along address and data lines.

If you want to access this from the port you will have to use Port FE. Only if you input here will the keyboard scan be accessible. The address lines you need to deal with are A15 to A8 and the data lines from D0 to D4. To simulate a key press you will have to put a value of 0 on the appropriate data and address lines.

## ACOUSTIC MODEM

*Bruce Whitfield of Oldfield Park Westbury Wiltshire writes*

**Q I own a Vic20 and I am thinking of buying an acoustic modem for it. Will I need to buy a special port, as the user port on the Vic includes an RS232, which seems to be usable with any modem. How much will it cost in extra phone bills? Will I be able to dial any computer bulletin board in the UK, and will the software be included with my modem to do this?**

A The Vic interface is an RS232, but not an RS232C. The RS232 on the Vic can only deal with 0V to 5V; a modem needs a range from negative voltage up to +12V. While the one on the Vic can handle TTL chips, a full 12V will be a two and a half times increase on its maximum rating — the result might be burnt-out chips. You would therefore need a full RS232C if you want to use a modem with your Vic.

If you did have a modem then in theory you would be able to access any computer in the UK. However, in practice the amount of information you would need in terms of phone numbers, passwords etc, would make it very difficult to enter more than a handful of bulletin boards.

## COPY COMMAND

*Philip Adcock of Penn House, East Harling, Norwich Norfolk writes*

**Q I own a BBC model 'B' 1.20S and have a wordwise chip. I find it easy enough to Print using control B and C, to get listings. But after coming from a ZX81, I find I miss an equivalent to the ZX81's *Copy* command. Is there a way round this? I have an Epson Dot Matrix printer, an FX80.**

*And J Rundle of Long meadows, Frimley Surrey writes*

**I own a BBC B and a Centronics 739 parallel printer, can you tell me where I can get hold of a screen dump? All the ones I have seen are for Epsons. Does nobody own a Centronics?**

A The Sinclair *Copy* command is very useful but is only made possible because of the dedicated printer, and special control lines. You will need a conventional screen dump routine for this. Fortunately there is an article on the Epson in the June 83 edition of *Laserbug* which has various demonstration programs, including a screen dump.

You might also be interested that because of mistakes in the manuals, Epson has published an errata sheet which is available if you send an SAE to them. The leaflet has a lot of information directed especially at the BBC user.

As for the Centronics — there are other people who use a Centronics printer with their BBC and it is the same issue of *Laserbug* to the rescue. There is a Centronics screen dump on page 20.

## FULL SPACEBAR

*D J Ridell of Caulker Bush Southwick Dumfries DG2 writes*

**Q I have a 48K Spectrum and wish to get a full keyboard with a spacebar for it. Could you tell me who makes one? Also will the Interface 1 for the microdrive be incompatible with such a keyboard?**

A I know of two keyboards with a full space bar: the Fuller FDS and the Fox keyboard. Both require you to remove the Spectrum circuit board from the existing case and fix it inside the new keyboard. This means that you will not be able to connect Interface 1.

None of the other solutions are ideal. Fuller can provide a buffer extension for their keyboard at extra cost; alternatively you could buy the Maplin ZX81 keyboard and fix different legends to the keys (DK Tronics might sell you some) since this one is connected to the computer by a ribbon cable.

In short, exactly what you require is not yet available, but I cannot see such an obvious gap in the market remaining unfilled for long.

**Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke*, PCW, 12-13 Little Newport Street, London WC2R 3LD**

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**DRAGON 32**, good condition over £100 of software 2 joysticks + cassette recorder books + magazines also light-pen £180 ono Tel 01 794 7079 evenings

**DRAGON 32**, 6 months old lots of software 2 joysticks + magazines sell £75 or swap for Spectrum 48K with software Tel St Ives (Cambridge) 64377 6-9 pm

**DRAGON 32**, + joysticks £140 ono + popular software below half price accept Spectrum in part-exchange Tel 041-427 0197

**DRAGON 32**, 8 months old + compatible cassette recorder joystick books + magazines £75 of software including King Frogger and Composer £200 ono Tel 01-854 9767 after 4 pm

**DRAGON 32 SOFTWARE FOR SALE** Donkey King Planet Invasion Katerpillar Attack, Phantom Slayer Defense Cosmic Zap Galactic Ambush Ring of Darkness Missile Command £8 each two for £11 Tel 0944 413087

**DRAGON 32** + joystick + assembler cartridge worth £40 + games including Donkey King Frogger Android Attack + books 3 months under guarantee bargain at £170 Tel (04??) 822133

## Ataris for sale

**ATARI 800** 48K manuals + joystick £235 Tel 01 580 7749

**ATARI VCS** cartridges between £15 and £5 Tel 01 907 8584 after 4 pm

**ATARI VCS** with controller 10 good games including Pacman Space Invaders International Soccer and Missile Command worth £250 will accept £110 Tel 734 2687 daytime 588 2145 after 4 pm

**ATARI VCS** 3 tapes including Space Invaders Asteroids Championship Soccer £80 ono Tel 01-958 0252

**ATARI TI99**+ software over £300 for CND84 Tel Halifax 244923

**ATARI** electronic TV game computer + 4 games cartridges Combat Empire Strikes Back Pacman Space Invaders ideal for Christmas £80 Tel Swanley 49778

**ATARI 400 16K** for 1 0 program recorder £120 worth of games including Miner 2049 Defender Back up Quick Shot, plus Atari joystick magazines in excellent condition 1 week good value at £280 Tel 01 550 0808 after 6 pm

**ATARI 400 16K** + 4 10 tape recorder lots of software Basic cartridge manual magazines + 1 joystick, will accept £230 ono Tel 840 5278 Andrew or David

**ATARI 400 16K** with cassette recorder also books and joysticks and some software only one week old still in original box, bargain at £145 Tel 01 330 2380 evenings only

**ATARI 400**, 48K recorder Basic manuals + £1 000 software £230 ono Call 0908 75094 after 5 pm

**ATARI VCS** + 7 cartridges Star Master Freeway Space Invaders Golf Star Racer with instructions Basketball with joystick + paddles £100 ono Tel 883 2241

## Wanted

**COMPUTER CASSETTE** Sanyo 77 101 Swap for ZX Printer Contact Louis, write to Flat 7, 25 Carlton drive Putney SW15

**WANTED SPECTRUM 48K** + cassette recorder also the Hobbit and Scrabble Tel 0202 882974 from 7 pm

**COMMODORE 64** with cassette deck at a reasonable price Tel 01-454 9641 call after 4 15 pm

**WANTED** Casio 602P with or without Interface Offers to Mr Haydon 21 Manchester Mansions London N19 3SW

**WANTED** ZX80s, any condition but must be in working order £10 Tel Threapwood 354 after 6 pm ask for William

**WANTED 48K SPECTRUM** Tel Wakefield (0924) 251793

**WANTED ATARI 800** Tel 01 938 2742 daytime or 04873 424 evenings Contact Colin Mason

**WANTED** Wico track ball suitable for Atari V c20/CBM 64 pay between £15 And £20 Tel 01-840 3410 after 5 30 pm

**48K SPECTRUM WANTED** plus 48K Spectrum hardware wanted Tel Bolton Lancs 0204 29813 Basingstoke, Hampshire 0256 798231

**WANTED** Spectrum 48K Ros 4 Gerards Close Lincoln Tel 0522 28298

**WANTED** BBC micro model B in working order Tel Durham (085) 07254 evenings also weekends

**WANTED** 48K Spectrum in exchange for Fidelity Sensory Chess Challenger 9 Tel 0222 461235 after 6 pm ask for Paul

## For sale

**AMBER 2400** printer hardly used original paper no interface £50 ono Tel Aldridge 51923

**COLECOVISION VG** 2 months 3 cartridges Donkey Kong Smurf Adventure £210 yours for £130 ono Tel 021 743 7238

**MANSION ADVENTURE 1**, for any other Dragon software M Gawlinski 291A Wootton Road Kings Lynn Tel Kings Lynn 671820

**NINE VIC20** software cassettes for sale including Trader Return from Castle Dread Crazy Cone Frogger Orbit Packer Cuda Frantic Strategic Advance and cassette 50 Tel Nottingham 202632 (private sale)

**48K LYNX** only five months old and 2 Lynx books newsletter Sultan's Maze Adventure games some home produced software as new £175 Tel 0249 812750

**FOR SALE** Axeman (Amber software), Backgammon (Psion) 16K ram (J K Gray) 30 Monster Maze Gap 2 (Amble systems) collectors recording system (W H Smith) super programs plus game cassette Fantantasy games (Psion) Chess (Microgen) Hints and tips ZX81 not only 30 programs for the ZX81 1K (Private sale) Tel Wensleydale 22717 after 5 pm

**A LIGHT PEN** for ZX Spectrum complete with program cassette £14 Tel 0602 233955

**BARGAIN** Mattel Intellivision with voice unit and 12 cartridges including 2 voice Total value £450 will sell for £115 ono Telephone Mark on Southampton 785699 after 6 pm

**16K VIDEO GENIE** with in built cassette recorder and a joystick + over £50-worth of software which includes Talking Radar Attack and Asylum quick sale required £180 ono Tel Worksop 771227

**INTELLIVISION VIDEO GAME** plus 2 cartridges Tel Freeland 482129

**£150-WORTH OF SPECTRUM 48K SOFTWARE** the best recommended software Tel Leigh (0942) 672068

**SHARP PC12 OM** + 3 manuals £48 with a cassette interface Write to 34 Ruby Street, BELFAST BT7 2GY

# NEW RELEASES

## FORCE FIELD




Silversoft have just released four new titles, their first new ones in quite a while All are for the Spectrum and are a mixture of 'shoot 'em up' and maze style games

*Mission Impossible* is a variant of *Lunar Lander* where you must move your spaceship through various asteroid belts to a safe landing and then blast your way back to the mother ship

Things become difficult after the first couple of successes by the addition of a force field which you must blast through within a few seconds in order to escape

The game is fairly addictive and perhaps that's what really matters, graphically though it is not up to the standard of the recent Quicksilva releases or Ultimate Play the Game

**Program** *Mission Impossible*
**Price** *£5 95*
**Micro** *Spectrum16/48K*
**Supplier** *Silversoft*
*271/273 Kings Street*
*Hammersmith*

## DEADLY SPIT

No prizes for guessing where *Metagalactic Llamas Battle at the Edge of Time* comes from

The proud llama has achieved its pre eminence via Jeff Minter's other Vic20 games *Metagalactic* (I'm not repeating the whole title again) continues the proud tradition

Highly evolved llamas are used to defend the last outposts of earth Using your joystick you must move your llama and make it spit The spit is deadly and must be bounced around the screen into the vicious arachnid mutants who will otherwise quickly evolve into even more deadly Weeviloids

**Program** *Metagalactic Llama Battle at the Edge of Time*
**Price** *£5 50*
**Micro** *Vic20*
**Supplier** *Llamasoft Software*
*49 Mount Pleasant*
*Tadley*
*Hants*

## DEACTIVATE

*Alice in Wunderlab* is an adventure game for the Commodore 64 The game pits you against a nuclear reactor which is melting down — a clock on the screen ticks away the seconds

Your task is to deactivate the reactor This involves finding your way around the power plant and solving various problems like a drunken professor, before time runs out and you (and countless thousands more) are blown to bits

There are three skill levels depending on how much of your lifetime you are prepared to spend on the game The simplest level takes at least three hours

**Program** *Alice in Wunderlab*
**Price** *£7 50*
**Micro** *Commodore 64*
**Supplier** *Arthur Loosley*
*16 Longland Road*
*Sidcup*
*Kent*

## BUG-EYED

Fantasy Software, which is the new guise of Quest Microsystems has launched its first program — *The Pyramid*

As Quest the programmers built up a good reputation with arcade style games like *Black Hole* and *Violent Universe*

With *The Pyramid* all the classic arcade features are retained with at least the veneer of classic adventure themes

A (highly simplified) version of the (highly ridiculous) plot is that you must fight your way through the 120 chambers of a mysterious pyramid

Each chamber is guarded by various kinds of alien from the fairly convetional bug eyed monsters to more arcane types like galactic tweezers

To escape each chamber you must survive long enough to collect an energised crystal and repeatedly drop it through the exit force fields, until they become deactivated

As you pass through more and more chambers, so you will accumulate numbers which are revealed (almost) every time you leave a chamger The numbers will form the basis of a competition to be announced later

**Program** *The Pyramid*
**Price** *£5 50*
**Micro** *Spectrum 48K*
**Supplier** *Fantasy Software*
*Falconberg Lodge*
*27A St Georges Road*
*Cheltenham*
*Glos GL50 3DT*

## LAP RECORD




*Chequered Flag* is the latest game to come from the Psion/Sinclair partnership

A sort of ground-based *Flight Simulation* it has the impressive graphics we've come to expect, with a smooth scrolling race track complete with trees and lamp posts

You can choose from a range of circuits and car types as you try to beat the lap record Hazards include oil and water spillages which can cause you to spin off the track

The only regret must be there are no other cars on the road to compete with — perhaps it was a problem of memory restrictions — but quite enthralling nonetheless

**Program** *Chequered Flag*
**Price** *£6 95*
**Micro** *Spectrum 48K*
**Supplier** *Sinclair Research*
*Stanhope Road*
*Camberley*
*Surrey GU15 3PS*

## GURU

The big problem with running adventure games on the Vic is memory, most of the really compulsive games need at least 16K

Romik have, however managed to fit their range of text adventures into only 3K additional memory expansion

*The Sword of Hrakel* appears to have all the classic ingredients — country under a curse which only you can lift, spells sorcery and mysteriously an enigmatic meditating guru in a dark gloomy forest

**Program** *Sword of Hrakel*
**Price** *£5 95*
**Micro** *Vic20*
**Supplier** *Romik Software*
*24 Church Street*
*Slough SL1 1PT*

## MUSHROOM

*Caterpillar*, sometimes known as *Snake* has been around for a very long time and several versions of it have been printed in this magazine amongst others

Although addictive, the game is so simple in essence that anyone trying to sell one had better ensure it is a cut above the rest

The game involves moving a caterpillar around a garden eating food As it eats it gets bigger — this is a problem, because the caterpillar must also avoid poisonous mushrooms that gradually fill the screen

Gemini has a version of the game for the BBC B that retains the original scenario, but adds to it in the form of another snake which must also be avoided

**Program** *Caterpillar*
**Price** *£9 95*
**Micro** *BBC B (32K)*
**Supplier** *Gemini Marketing*
*18a Littleham Road*
*Exmouth*
*Devon EX8 2QG*

## GOTHIC HORROR




Battle the Ants in the Walled city of Antescher, it says on the box of Quicksilva's *Ant Attack* — they're not kidding.

Escher's nightmarish world of geometrical impossibilities coupled with monumental Gothic edifices is faithfully reproduced in *Ant Attack*.

The program gives you a three-dimensional view of the walled city — all grey walls and crenelations, and you can change your viewpoint on the city as though switching from one monitor to another by simply pressing a key.

Forbidding as the city sounds, you must enter it to rescue a member of the opposite sex who has foolishly got her/his self trapped there (you can choose the sex of the victim!)

The ants will try to stop you of course — a few of their bites and that's it. An excellent piece of visually stunning Gothic horror from a company whose Spectrum programs seem to be getting better and better.

**Program** *Ant Attack*
**Price** *£6.95*
**Micro** *Spectrum 48K*
**Supplier** *Quicksilva, Palmerston Park House, 13 Palmerston Road, Southampton SO1 1LL*

## X-WORD

*Crossword Puzzler* is a program which generates crossword puzzles. It is divided into two sections, Xword-Gen, which builds up a datafile of the words you have chosen and their positions and Word-Play which uses the data file you have created to create the actual crossword.

The program designed for the BBC B, comes with a manual and three sample puzzles including one based on the first crossword puzzle ever designed.

**Program** *Crossword Puzzler*
**Price** *£5.00*
**Micro** *BBC B*
**Supplier** *National Extension College, 18 Brooklands Avenue, Cambridge CB2 2HN*




## COWBOYS

*Saloon Sally* is the first BBC release from Psion that isn't adapted from an original version of the Spectrum.

One of its key features is having a heroine rather than a hero as its chief protagonist.

As Sally the saloon owner you must protect your saloon from brawling cowboys and collect gold.

Also ventured is a highly appropriate soundtrack in the form of the saloon pianist's accompaniment.

Sally can defend herself from the brawling hordes by throwing chairs and tables — completing a screen by collecting all the gold moves you on to the next screen.

**Program** *Saloon Sally*
**Price** *£7.95*
**Micro** *BBC A + B (32K)*
**Supplier** *Psion, 2 Huntsworth Mews, Gloucester Place, London NW1 6DD*

## 21 GAMES

Don't blink. You might miss another book coming out for the Electron. Whatever uncertainties some of the computer press may have expressed about its place in the market the book publishers are in no doubt.

*21 electrifying games for your Electron* is almost what it says. 21 not bad by book standard, games with some vaguely useful notes on the various techniques involved in each.

Not therefore, bad value but wait a year and it'll be 50 games for half the price.

**Book.** *21 Games for the Electron*
**Price** *£5.95*
**Micro** *Electron*
**Supplier** *Granada Publishing, 8 Grafton Street, London W1X 3LA*

## CRACK UNIT




Wintersoft's *Ring of Darkness* is considered by many to be the best ever game for the Dragon 32. It's perhaps surprising then that the company has decided to issue its next program *Operation Gremlin* on the Oric.

Described as a kind of arcade adventure mix, your objective is to clear the space city of Syron of the hordes of gremlins who have swarmed over it.

Using single key instructions you command a crack unit of troopers who must be supplied with weapons for their battle — you must also get them safely out of the city once the battle is won.

You will need a mixture of quick reactions and strategy to do well.

**Program** *Operation Gremlin*
**Price** *£6.95*
**Micro** *Oric 1*
**Supplier** *Wintersoft, 30 Uplands Park Road, Enfield, Middx EN2 7PT*

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases, Popular Computing Weekly, 12-13 Little Newport Street, London WC2R 3LD

# Ziggurat

## A slice of the cake

Many moons ago I wrote a few pieces in this column on the growth of microcomputer ownership

One of my points was that to extrapolate from present trends to the future was a difficult and risky occupation I also mentioned the logistic curve

The logistic curve for those new to the term, is a growth curve which is based on the idea that the probability that a person will buy an item will depend upon the proportion of people already with that item

Or to put it another way the more people there are with a computer the more likely it is that a person without a computer will decide to buy one However as the number remaining without dwindles although the proportional rate of purchase is increasing the actual numbers involved are getting smaller

In short the market becomes saturated and the rate of purchase slows

In mathematics the number of items bought will be proportional to $p^*(1-p)$ where $p$ is the proportion of individuals who have one of the items (assuming that unlike me most people only have one computer)

The shape of the logistic curve is an elongated S

The curve starts fairly flatly to it takes some time for the growth in numbers of items to pick up If the curve was extrapolated at this stage then the resulting prediction would be far too low I remember reading an editorial in *Practical Computing* sometime in 1980 in which there was a prediction that by the end of 1983 there would be 300 000 computers in the UK Sinclair alone has sold far more than that That prediction was made at the flat point of the curve

After this part of the curve the slope gets steadily steeper and steeper and it is in this portion of the curve that growth appears explosive

The rapid growth continues for a time but soon a third phase is reached in which the growth begins to slow, as the market begins to saturate

I believe that *microcomputers* are now in this third phase with the fastest of the growth being in the past (I believe it has been passed for some months but there are no figures to check)

Soon we will enter the final phase in which there will be next to no growth Nearly everyone who might want a computer will already have one Then the pattern will change People will begin to replace their old computer with either a new version of their old model or a more advanced machine In this period the absolute number of computers will not grow greatly but (as with the car industry) computer manufacture will continue steadily being based on the exchange market

If I am correct the market for cheap introductory computers is about to decline Any new manufacturer with a low-cost computer has no chance at all and most of the later manufacturers of cheap computers seem to be on a knife-edge Sinclair and Commodore being among the first seem somewhat safer

A few months ago at the time when the market seemed to be exploding the clamour to have a piece of the action led to proliferation in companies supplying the ancillaries to computers — software hardware add-ons the specialist shops and the magazines

Everyone seemed to behave as if the then projected (and inaccurate) growth rate would continue indefinitely

Now computer manufacturers are losing money are becoming bankrupt software houses are folding and one computer shop I have seen is selling BMX bikes as well!

Companies are now fighting ever more fiercely for a share of a smaller cake

And the number of casualties is rising ■

**Boris Allan**

# Puzzle

## 5th November

**Puzzle No 80**

Jamie Sue and Ben were standing outside the corner shop examining the fireworks they had just bought.

Each had chosen a different selection of five fireworks and each had spent exactly £1 The fireworks were priced as follows

| | |
|---|---|
| *Golden Waterfall* | 12p |
| *Krakatoa Cascade* | 14p |
| *Fairy Fireglow* | 18p |
| *Mine of Serpents* | 32p |
| *Depth Charge* | 48p |

If Jamie had at least one *Golden Waterfall* and Sue had at least one *Depth Charge* which fireworks did each buy?

**Solution to Puzzle No 75**

The distance *D* walked across the heath (in yards) is equal to $\sqrt{(1320^2 + a^2)}$ where $a$ = 1760 − *N* and *N* equals the distance in yards travelled along the road The time taken (in hours) is given by (*N*/(4 * 1760)) + (*D*/(3 * 1760))

The program tries different routes the times for which are entered into the dimensioned array *A*(*N*) and checked to find the shortest

```
10 DIM A(1760) 20 FOR N 1 TO 1760 30 LET D
SQR(( 1320 * 1320) + (1760 N) * (1760 − N)) 40
LET A(N) − (N/(4 * 1760)) + (D/(3 * 1760)) 50 NEXT N
60 LET T − 1 70 FOR N 1 TO 1760 80 IF A(N) < T
THEN GOSUB 200 90 NEXT N 100 PRINT
SHORTEST ROUTE — LEAVE ROAD AFTER M
YARDS 110 STOP 200 LET M − N 210 LET T =
A(N) 220 RETURN
```

Running the program shows that the quickest route is to leave the road 263 yards from Longfield

**Winner of Puzzle No 75**

The winner is Tim Clapp Hessley Knob Warwick who receives £10

# Top 10

**BBC**

1 (1) Planetoids (Acornsoft)
2 (3) Killer Gorilla (Program Power)
3 (6) Hopper (Acornsoft)
4 (5) Philosopher's Quest (Acornsoft)
5 (2) Snapper (Acornsoft)
6 (8) Arcadians (Acornsoft)
7 (9) 3D Bomb Alley (Software Invasion)
8 (7) Dr Who The First Adventure (BBC Soft)
9 (—) Alien Swirl (Program Power)
10 (—) Rocket Raid (Acornsoft)
At Micro 8
Figures compiled by Micro Management Ipswich 0473 531811

**ZX81**

1 (2) Flight Simulation (Psion)*
2 (1) Football Manager (Addictive Games)
3 (2) 1K Chess (Artic)†
4 (8) 1K Games (Artic)†
5 (—) Asteroids (Quicksilva)
6 (5) QS Asteroids (Quicksilva)
7 (9) Defender (Quicksilva)
8 (—) Geography (ICL)
9 (3) Espionage (Artic)
10 (4) Space Raiders (Psion)
(Figures compiled by Websters & Co )
*Runs in 16K †1K

**Dragon**

1 (3) Talking Android Attack (Microdeal)
2 (7) Mined Out (Quicksilva)
3 (—) The King (Microdeal)
4 (4) Cuthbert Goes Walkabout (Microdeal)
5 (—) Frogger (Microdeal)
6 (2) Ring of Darkness (Wintersoft)
7 (5) Space War (Microdeal)
8 (—) Wizard War (Salamander)
9 (—) Caterpillar Attack (Microdeal)
10 (—) Dragon Trek (Salamander)
(Figures compiled by Boots & Co London)

**Vic20**

1 (1) Grid Runner (Llamasoft)
2 (2) Arcadia (Imagine)
3 (4) Wacky Waiters (Imagine)
4 (3) Catcha Snatcha (Imagine)
5 (—) Laser Zone (Llamasoft)
6 (—) Escape MCP (Rabbit)
7 (—) Abductor (Llamasoft)
8 (—) Paratrooper (Rabbit)
9 (—) Frantic (Imagine)
10 (8) Metagalactic (Audiogenic)
(Figures compiled by Boots & Co London)

**Atari**

1 (1) Blue Max (Showcase)†§
2 (—) Ultimate I (Sierra on-line)‡
3 (—) Miner 2049er (Big Five)
4 (6) Arcade Machine (Broderbund)‡
5 (—) Shadow world (Showcase software)†
6 (—) Spiders and Sorcery (CBS)
7 (—) Repton (Sirius)†‡
8 (7) Preppie (Adventure International)
9 (5) Bug Off (Adventure International)
10 (—) Arrow of Death (Channel 8)
*Cartridge †32K cassette ‡48K disc §32K disc
(Figures compiled by Calisto Computers Birmingham 021-632 6458)

**Books**

1 (1) *Advanced User Guide for the BBC Micro* *Bray Dickens and Holmes* (Cambridge Micro Centre)
2 (6) *BBC Micro Book Basic Sound and Graphics* *McGregor and Watt* (Addison Wesley)
3 (7) *Advanced Graphics on the ZX Spectrum* *Angell and Jones* (Macmillan)
4 (8) *Commodore 64 Programmers Reference Guide* *Commodore* (Commodore)
5 (—) *Spectrum Machine language for the absolute beginner* *Tang* (Melbourne House)
6 (—) *Master your ZX Microdrive* *Pennell* (Sunshine)
7 (10) *Structured Programming with BBC Basic*, *Atherton* (Halsted)
8 (5) *6809 Assembly Language Programming* *Leventhal* (Osborne)
9 (6) *A Hundred Programs for the BBC Micro* *Gordon* (Prentice-Hall)
10 (—) *Supercharge your Spectrum*, *Webb* (Melbourne House)
(Figures compiled by Watford Technical Books, Watford 0923 23024 Prestel 26544)
(Last Week's position in brackets)

**Spectrum**

1 (2) Zzoom (Imagine)
2 (5) Jet Pac (Ultimate)
3 (1) Flight Simulation (Psion)*
4 (—) Terror-daktil 4D (Melbourne House)
5 (3) Tranz Am (Ultimate)
6 (—) Pssst (Ultimate)
7 (4) Zip Zap (Imagine)*
8 (6) Kong (Ocean)
9 (—) Horace and the Spiders (Psion/Melbourne House)
10 (—) Arcadia (Imagine)
*Requires 48K
(Figures compiled by W H Smith and Son London)

PLEASE PUSH ME THE FOLLOWING

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|---|---|---|
| MORRIS MEETS THE BIKERS for any Spectrum as featured in last week's cartoon special | £6 | ☐ |
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| GO TO JAIL for 48K Spectrum. We dare you to play this classic against your computer | £6 | ☐ |
| PIMANIA The best adventure game ever reviewed (Sinclair User). With £6,000 prize and free terrible hit record!!! — 48K SPECTRUM | £10 | ☐ |
| DRAGON 32 | £10 | ☐ |
| BBC 32K | £10 | ☐ |
| THE PIMAN'S CHRISTMAS STOCKING (including PiMan 1984 Kartoon Calendar & Your Own Blank C20 Komputer Cassette & THE PIMAN'S GREATEST HITS stereo LP) | £5 | ☐ |
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